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Think Tank must look to new horizons

WHILE the Department of Industry hosts the microelectronics industry (see story this page), the government backed scheme to train unemployed young people in computing expertise, Threshold, is threatened (see page 11).

This applies illustrates the dangers of developing national policies towards information technology in an ad hoc way, without any clear, coherent goal.

The current attention given to the microelectronics industry and the use and impact of micros is to be welcomed, although the motivation for this sudden interest lies more in the political climate than in the needs of the industry.

In the mass media, micros and unemployment are regularly linked. As unemployment is one of the most vital political issues of the day, micros have therefore entered the political arena. Hardly a day goes by now without a British politician making a speech saying that micros are the cause of unemployment.

employment and/or that we must invest in micros to increase employment prospects for the future.

It is ironic, however, that the Threshold scheme, whose future is in some doubt, is designed to cut unemployment and to create a fresh source of skills for the computer industry, which currently is so severely short of labour.

What is particularly worrying is that very few politicians and civil servants would even consider the questions of aid to the micro industry and the Threshold scheme as being interlinked. But it is clear that one of the keys to prosperity in the future will be the availability of a pool of skilled people who can provide "added value" to the micro by putting the chips, computers and telecommunications system in a wide range of applications.

The DoI, therefore, to be congratulated on identifying micro applications as an important part of its scheme. There should, however, be an equivalent awareness in government of the need to keep, develop and encourage the skills

and expertise needed to invent and develop those applications which can not only help improve the efficiency of British industry but could also become strong export-earners.

In order to achieve this, a major programme of education and training should be undertaken by the government, aimed at all levels of society, from primary schools to managing directors. This scheme should aim at explaining the potential of information technology to all and to boost special skills where they are particularly needed.

The DoI micro support scheme places education of existing industries to the potential of micros as a central theme of its policy and is a step in the right direction.

From the wider perspective of the future demands of an information society, however, the path along which the step is being taken is too narrow, too isolated and too meandering. It is to be hoped that the government's Think Tank takes into the impact of micros today into a wide look at broader new horizons.

DoI allocates £15m for micro schemes with more to come

THE Department of Industry is now prepared to spend virtually any amount "within reason" to ensure that UK industry grasps the opportunities being presented by the microprocessor. This was made clear by the Department last week, when the £15 million interim microprocessor applications support scheme was announced in a Parliamentary answer by Eric Varley, Secretary of State for Industry.

This scheme is seen as an exercise in testing the water temperature for a large part of the aim of the scheme is to see just how many companies come forward looking for funding.

Following the report from the Advisory Council for Applied Research and Development on the applications of solid state technology, the Secretary of State has said that he will make a more detailed statement on the scheme later in the year — a reference to the fact that more money is soon to be committed.

If the response from industry is considered inadequate by the Department, it is probable that the scheme will be "tweaked up" regardless of the existing plans to increase its funding budget. The form of this "tweaking" may well be directed towards increasing the effort put into education of the industry.

This is an area in which the Department already knows it has a battle on its hands, particularly in industries other than the computer and data processing business where the micro is already well entrenched. The mechanical engineering industry, in particular, is a special target for the Department.

Statistics indicate that only 50% of British manufacturing industry know of ways that the micro could be used. What is disturbing is that only 2% of that number are actually doing anything with them.

Two firsts in West Midlands' schools competition

TWO first prizes have been awarded in the West Midlands Computer Education Group's schools computing competition called Spec. The winning schools are Oundle High School, from Wombourne, near Wolverhampton, and Sheldon Heath School, Birmingham. They will receive a cup from IBM, teaching materials from ICL, and £200.

The entry from Sheldon Heath School was one of the few related to industry rather than leisure. It proposed that computer-produced blorhythmic charts should be used to determine what job a person does when he arrives at work each morning. In-car assembly, for instance, someone who is at a physical "high" would be given strenuous work to do, and so on. This would also relieve boredom.

Oundle's entry was a project on regional car parks in which motorists would use a magnetic card to pay for parking rather than coins. Each car would be linked online to a central computer, which would keep track of each motorist's credit rating, and open or not the car parks gates appropriately.

There were four runners-up. Fourteen schools submitted 25 entries in all.

PO ops call to end Sunday night shifts

By Bernard Allen

FIRST office computer operators are to push for the abolition of Sunday night shifts by next year. This is the result of a policy decision taken at the quarterly meeting of the Data Processing Service branch committee of the Society of Civil and Public Servants.

NEWS IN BRIEF

Canada micro based on 6800

CANADIAN firm, Mini Peripherals Inc. of Ottawa, has launched a microcomputer based on the Motorola 6800 chip. Known as the M101, the system is the peripheral manufacturer's first venture into this market.

One is currently on display at Ontario House, London, SW1 and a typical system has 34K bytes of memory.

Voice response

FURTHER expanding its rapidly growing interests in the data communications field, Real-Milgo is to take on marketing of voice response systems from Wavelet of San Diego, California in Europe, the Middle East and Africa. Wavelet systems enable users to interrogate computer files via a keypad acoustically coupled to the telephone mouthpiece, and to receive a verbal response, the words for the message being selected from a menu stored on a random access acoustic disc.

Intel 8086 launched

NOW available in the UK via GEC Semiconductors is the new Intel 8086 16-bit microprocessor. It is a software compatible with other Intel microprocessors. The MCS prototype development kit for the 8086 is also available through GEC Semiconductors at a price of £235.80, plus VAT.

B3500 donation

LONDON office of Chase Manhattan Bank has donated its old mainframe, a Burroughs B3500, to Brunel University's computer science department following the installation of its Automated Transaction-Based Accounting System.

Monitoring system

TO evaluate the performance of its 1100 series systems, Sperry Univac has developed a new monitoring system called the Performance Display System. PDS has been installed at Sperry Univac's International Division Benchmark Centre in West London.

IBM support

THE extended control program support feature which offers considerable improvements in the performance of the IBM VM/370 operating system and is standard on the 370/148 and 158 (C/W, July 8), is now offered as a Request Price Quotation option on the 3032 and 3033. The microcode costs £18,755, purchase only, but a 3033 user also needs to add extended control store to run it, and this costs £15,828 or £570.80 a month.

Unilever follow-up

A MAJOR success has been scored by the IBM-compatible processor supplier, Intel, with a follow-up order from its first UK customer, Unilever Computer Services Ltd. The new order is for two Intel AS/5 machines for the UCSL centre at Watford. UCSL already has one AS/5 at its Burgess Hill, Sussex, centre (C/W, October 6, 1977).

IBM anti-trust suit ends in mis-trial

THE anti-trust action against IBM that Memorex started five years ago reached an anticlimax last week with Judge Samuel Conti declaring a mis-trial when the jury failed to reach a unanimous verdict after nearly a month's deliberations.

Memorex has now asked for a new trial with a jury, while IBM wants a directed verdict, which would involve the judge issuing a verdict himself.

If this happens and the judge finds for IBM, it will be the fourth effective defeat for the plug-compatible manufacturer challenging IBM in the courts.

In early 1975, IBM won its appeal against an anti-trust verdict favouring Telax. Later that year, Telax abandoned its plans to take the case to the US Supreme Court.

In early 1977, Sandra Associates accepted a comparatively small development contract from IBM as an out-of-court settlement before its case involving its subsidiary, Sandra Data Systems, now part of Harris Corp, went on trial.

Soon after the Calcomp anti-trust action against IBM, which had been planned and organised with almost fanatical dedication by Calcomp, was dismissed by the Los Angeles Federal District Court, Judge Ray McInchols directed the jury to accept IBM's motion that there was no case to answer.

A few weeks later Calcomp appealed but, well over a year after, it is still waiting for its appeal to be heard.

Plessey makes 600 redundant

OVER 600 redundancies were announced by Plessey Telecommunications last week at their Edgware, London, plant, where production of Strowger telephone exchange equipment is being run down.

Packet networks off-the-pog

OFF-THE-PEG packet switched networks are to be marketed from this month by Telenet Communications Corp. This follows purchases by the Hawaiian Telephone Company and the British Post Office (C/W, February 2) of Telenet Processors, interfaces and network control centres to enable their subscribers to communicate with databases via US Telenet

DBMS spearheads H-P small system attack

SOFTWARE houses and OEM dealers are the main targets of Hewlett-Packard's new attack on the small systems market, the HP 250, which features a mini version of the Image database management system from the HP 3000 range.

As expected (C/W, June 28), the HP 250 is based on Hewlett-Packard's 16-bit micro, which is already used in the desk-top System 9849. The price for a basic

HP 250 direct from Hewlett-Packard would be about £18,500. In addition to Image/250, software for the system includes a supporting Query language, a report generator, VDU screen formatter and Hewlett-Packard's own Business Basic.

A minimum configuration includes a keyboard, VDU, 128K bytes of system memory, 32K bytes of user memory, twin 1.2M byte floppy discs and a bi-directional matrix printer.

Tandem starts UK operation

THE UK subsidiary of Tandem Computers Inc. of Cupertino, California, formally came into existence on July 5, under managing director Jack Chappman, who was formerly with the Tandem sales team in London.

Tandem makes and sells dual or multiprocessor minicomputers under the Non-Stop trade mark. They are designed for high reliability and no single component or subsystem failure can interrupt processing.

First UK customer was Barclays Bank International, which installed a dual system in January for real-time foreign exchange dealing.

Interface standards could save \$55m in US

THREE interface standards for medium/large systems that could save the US government an estimated \$55 million over the next five years, have been proposed by the US National Bureau of Standards.

The standards relate to disc and tape drive interfaces and all federal agencies will have to adopt them if they become Federal Information Processing Standards, FIPS.

All the proposed standards incorporate technical specifications prepared by the NBS and the American National Standards Institute, ANSI.

Meanwhile, ANSI is carrying out a poll of its members on a proposal to make IBM's 360/370 I/O interface a voluntary standard.

The NBS is to invite computer equipment manufacturers to sponsor technical experts to work at NBS with the bureau's scientists on developing standards for federal use.

Nabisco wanted distributed processing not distributed problems -so they ordered the Nixdorf 8820

When you are one of the world's largest food manufacturers and you are planning to expand your vitally important order processing and stock control system, you cannot afford problems.

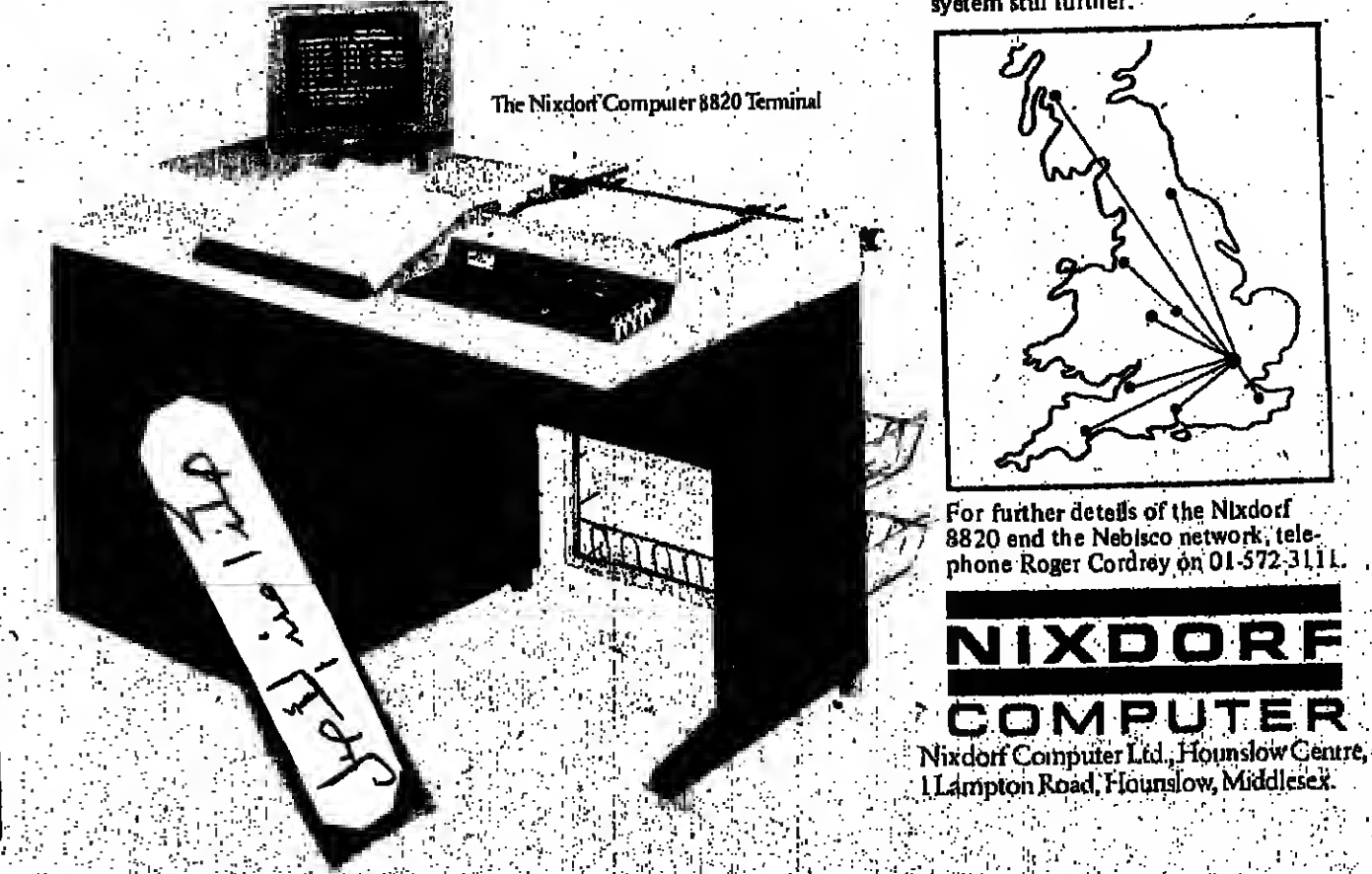
Teke Nabisco - famous for Shredded Wheat. They wanted to further sophisticate their computing facilities by establishing an integrated communications network, with auto-dial at the master station and automatic answer at the remote sites. Their depot staff were not computer-trained personnel. They knew the sort of problems that arise in such distributed networks.

Problems like: "We had a power failure and all our data was lost." - "Someone has removed a diskette with files left open." - "We have very little office space available." - "We do not want to learn another, non-standard language." - "Can we overlap input/output operations?" - "We may need up to 60K of memory." - "Our people here never used a computer before."

A company like Nabisco does not venture into a project like this with eyes shut. They looked at a number of terminal systems and only one manufacturer had a machine that could provide a satisfactory solution to all those problems and more besides.

Nixdorf is the manufacturer and the machine is the Nixdorf 8820 intelligent terminal.

So Nabisco purchased 10 Nixdorf 8820s and the entire system went live at all depots on April 1st. They are now looking to develop the system still further.



For further details of the Nixdorf 8820 and the Nabisco network, telephone Roger Cordery on 01-572-3111.

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Ten years ago...

COMPUTER WEEKLY
JULY 11, 1968
£230,000 SRC grant for research and development on advanced computer systems went to Manchester University's Department of Computer Science. A fast-growing computer industry, which is now a major part of the UK economy, was then in its infancy. The first major computer in the UK, the Ferranti Mark I, was then in use at the University of Manchester. It was a 19-bit machine, built in 1961, and cost £10,000. It was the first computer to be used for business purposes in the UK.

DOWNTIME

by Chad

Where to place the UK memory plant

MUCH has been made of the fact that blunt northern English place names seem to damn to disaster the NEB's jolly plan for an all-British semiconductor memory plant. Certainly the euphonious Spanish names in Silicon Valley — Cupertino, Palo Alto, Santa Clara — are difficult to match. Even Sunnyvale somehow sounds a nicer place than Port Sunlight.

But a glance at the map shows that there are in fact several "splendidly appropriate" locations to be found in and around the "trial north," even if Mosley is ruled out as being too far south.

Moss Side, Manchester, can certainly put in a reasonable claim for consideration, while Holme Moss has delightfully easy echoes of the dark days when Britain stood alone amid the gathering gloom.

Critics of the whole plan insist that only RAMsbottom brings out the true utility of the project, but on balance I prefer the quiet optimism expressed in the name RAM-shope, which is to be found at the foothills of the Cheviots in Northumberland.

Automating by degrees

Do you ever get the feeling that you can't get away from computers anywhere these days? I was at the Degree Show of the Royal College of Art, as unlikely a place for mechanical thinking as one could imagine; but sure enough, our ubiquitous trade raised its head in several places.

One graphics student was working on the design of characters on VDUs, using elaborate home-made electronic models. Another had produced a set of large colour display characters for Ceefax, and had

studied the problems of laying out Ceefax pages effectively. An industrial designer had made a full-scale mock-up of a combined VDU and printing terminal, with the printer sitting in front of the screen and swinging up out of the way in an ingenious manner when not required.

As might be expected, in the Design Research Department there were descriptions of theoretical studies about "computer modelling and gaming being important tools in the participation of a criti-

cally insightful activist lady in enhancing environmental awareness..." Social Science waffle is ubiquitous too.

The rest of the Show, by the way, was the most amazing collection of graphic designs, ceramics, glass, textiles, furniture, and industrial designs, highly original and produced with exquisite care. There was a complete set of spoof World Cup stamps, complete with first day cover depicting two footballers embracing à la Rindin, which the Post Office humbly turned down for public use.

The spice of conference life

THE Services Congress at Barcelona was a refreshing chance for my reporter to get up-to-date with the latest American slang. For instance, he discovered that those called on the programme "Accompanying Persons" (In former sexist days, "Wives") are known at conferences in the US as "Spice".

Spice is the plural of Spouse, get it?

He also picked up some gems of conference double-talk, much of it, let it be known, from non-Americans.

A Frenchman giving a paper about bureaux hit by competition from microcomputers kept talking about "negative growth".

Best deliberate crack of the Congress came from the president of MSA Inc, J. P. Imlay, who hails from Jimmy Carter country — Atlanta, Georgia.

He described how he had been made responsible for getting the President's brother Billy to the Inauguration. Said he, "We had terrible trouble getting hold of a bullet-proof mule."

NCC sponsors US programming project

WHEN competitive systems consultants and software houses combine the management, marketing and technical skills of their senior staff, something exciting is the motivator. The Interlock export project is precisely this. Aimed initially at the vast US market on an offshore programming basis, it is sponsored by the National Computing Centre and has been developed in conjunction with six systems houses, selected from among over 60 tenders for their complementary export experience.

The NCC went out to tender for the preliminary work necessary to get the project off the ground in April last year. Work by the main participating companies, Altargo and Peat Merwick Mitchell with the project manager from Data Logic, now acquired by the Raytheon-Coscor group, was supplemented on a consultancy basis by contributions from Data Skill, F International and Patel.

In a chicken and egg situation, the NCC had the difficult task of planning a market drive in the US while not knowing the



Steve Shirley, director of F International, has been acting in a consultative role to the National Computing Centre's Interlock scheme for the export of invisibles, in the form of programming, to the US. Here, she describes one such scheme, sponsored by the NCC, which has been developed in conjunction with six systems houses. Altargo, Peat Merwick Mitchell, Data Logic, Data Skill, Patel, and F International. Consequently, a drawing board project has crystallised into a working proposition and the UK now has a specific remote programming service to offer American clients.

package of services which the Interlock team was going to come up with as feasible. Not surprisingly, six participants meant six initial reactions on most points. Surprisingly, however, members talked freely about their export experiences, approach to programming

assignments, contracts and much which is normally classed as stock-in-trade.

Agreement can be reached with amazing speed when top professionals approach a problem with a common aim. Indeed the opportunity to plan properly a disciplined approach to offshore programming, with the very real prospect of sizeable future years perhaps (less than 1978, even overcame any reservations about speaking so freely among ones competitors. The calibre and mature personality of the project leader from Data Logic, Robin Williamson, was, and still is, a significant factor in binding the team together.

For in the interim months, a drawing board project has crystallised into a working proposition — the UK now has a specific remote programming service to offer American clients — and indeed the first success was a £20,000 a year software consultancy contract awarded to Altargo last year (CW January 5).

The working proposition has several quite distinct components. Firstly, a fully documented "control manual" setting out mandatory procedures, minimum procedures and guidelines as to the flow of information between US client and UK supplier via control centres.

The control manual, a techni-

cal working document supplemented by marketing literature, is itself impressively comprehensive. In over 200 pages, it covers most expected eventualities from the US client's definition of requirements to the UK supplier's delivery of the operational solution.

Probably the most important section is concerned with the control centres within the client's and supplier's organisation. Each such centre, under a designated project controller, co-ordinates the flow of information to ensure that the parties, on either side of the Atlantic, are working on a common information base and avoid the pitfalls of misunderstanding of requirements and activities which can jeopardise the success of any project.

A further key concept implicit in the control centres is the maintenance of information on project progress throughout, and the monitoring of achievement against defined milestones. Nothing radical, nothing new. Yet how often do major projects go awry because the simplest of project control techniques have not been applied. Interlock programming places great emphasis on proper planning and monitoring of all activities.

The second component is the marketing effort under the aegis of the NCC via selected agents in the US, primarily management consultancies, which know the US market, are known in it and often have clients seeking implementation of their recommendations.

Implementation of date processing projects in the US is a phenomenally expensive process, mainly due to the high salaries paid, and indeed needed, in a country with both a high cost of living and high standard of living. UK costs when working remotely are, of course, much lower although the management and communication overheads are necessarily high. So gross margins have to be meticulously controlled.

For while the current dollar sterling rates hold, offshore programming via Interlock offers significant cost advantages as well as assured quality to US clients. Interlock's prime advan-

tages are, however, not cost but the quality control of the service by the NCC over and above the high standard of work regularly produced by the UK service industry.

So what is the NCC involvement likely to offer? It is tied into audit procedures, again well documented in standard format and Americanised in style by a true-born American.

The audit activity is designed to yield regular snapshots of each project plus notes as a guide to the next audit. It includes the financial status of the project, a check that the management mechanisms are fully operational, security in all its many aspects, vetting of the supplier's control centre, regarding facilities such as telex, and checks that the project files are complete, minutes of meetings filed appropriately and a host of details to check on staff morale, progress reporting and, of course, technical quality checks.

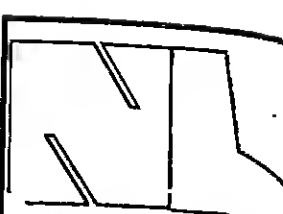
In practice, as in most auditing, an overall check is expected to be made first and then only if the auditor has reason to investigate further, does he, or she, focus on areas of great detail.

NCC's Interlock thus protects the client from closure of the supplier.

Registration of would-be participating companies based in the UK will depend on satisfying criteria similar to those required for ordinary membership of the CSA. The NCC will itself appraise each firm before formal registration and possibly also on each annual renewal.

Participating firms, selected by size and requisite experience only, quote independently and competitively on each tender. The contractual arrangement is finally between the selected supplier and the client, the NCC retaining an impartial role as monitor.

The enthusiasm of the six companies working on the project has been quite amazing. All have injected significant management and technical effort even after the formal contract awarded by the NCC was successfully completed on time. Now the Interlock ball lies firmly in the NCC's court.



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- * Full Character Editing Facilities
- * Block Transmission from Screen by Line or Page
- * Green Phosphor Non-glass screen



Models 7001-7002

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- * Selectable Baud Rates from 50 to 19,200 Baud
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- * Selectable Half or Full Duplex
- * Video Output for External Monitors
- * Green Phosphor Non-glass Screen



Model 7000

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GILB'S MYTHODOLOGY

Automatic correction of simple input errors should be the norm



WE think we are advanced with our online interactive terminals. Yet one of the main excuses for the interactive technology is the ease with which simply input keying errors can be corrected immediately, while the source document is still present, or the telephone contact is still on the line.

Personally, I would maintain that the use of human operators to correct any errors which are easily correctable by computer logic, is a misnomer of human beings. It is not productive. It does not speed throughput. It is not economic. It is not reliable.

I believe that most common errors can be fully automatically corrected. I am speaking about errors such as the random and accidental keying of a single character or misinterpretation of a single character, which accounts for about 80% of the typical errors.

I find very few systems which actually practice automatic correction of any sort. I find that the typical systems designer has received no training in the subject, has no experience in the subject, and is not required by his management to do such things. The fact that such techniques work and have done so for years in some installations, does not bother him in the slightest.

One prerequisite for automatic correction is the same as with automatic correction using parity bits. We must design more redundancy into the input. There are many ways to do so, such as humanised codes (John JONES, SURREY), such as checkwords (23456-JONES), repetition (23456-23456) or even multiple check digits.

This brings us to the next issue. The use of a file to enable us to make corrections is a critical prerequisite for most practical correction attempts. Further, we need the direct access capability of looking around via different search

keys, at sequential or similar groups, and at random.

We need to be able to match input data (such as a payment amount of 235.85) coming in with faulty identifiers against similar (billed 235.85) data on the file. This use of additional data elements in the input, and matching exactly or approximately against the file data is a powerful tool in confirming a correction hypothesis, or selecting the most probable alternative from among several possible corrections.

Any attempt to do automatic correction without making use of this additional data related to the faulty data element, will

be unnecessarily difficult.

The exact logic or correction procedures follows naturally for an examination of the common sense human correction procedure. It is important, however, to recognise from the outset that the objective is rarely "perfect correction of all errors". A more realistic objective is to automate the bulk of all common corrections, leaving the really difficult ones for human attention.

Sometimes we apparently do correction of errors by the simple trick of ignoring the "errors" when they occur at the end of a concept. We can do so in some cases because we have carefully designed the

codes to be unique in the first few characters. The use of longer codes is really only for readability in these cases, and experienced operators may quickly drop redundant parts of the codes.

I'm sure that some concerned readers are worried about the costs of doing all these wonderful things. If they were to look at some practical experience, then it would become clear that the initial development costs are minor, and all costs of automation are quickly repaid.

The myth that you cannot correct input automatically needs to be unlearned.

LETTER TO GILB'S MYTHODOLOGY

Why verification is necessary

I REFER to Tom Gilb's Mythology entitled "Verification Dead - Almost" (CW, June 15). My reply is "Verification not yet extinct - but an endangered species".

In international banking, where extremely high value funds transfer transactions are processed in real time, it is not at all uncommon, particularly in the latest minicomputer-based, dedicated processor applications, to find carefully designed key-verification techniques incorporated. This is not, in my view, a sign of "lack of imagination or of training of the designer" as Tom Gilb glibly claims, but quite the opposite.

In Citibank, which is certainly not renowned for its lethargy in keeping pace with technology nor for its lack of imagination in systems development, verification is still sometimes used. Conversational, program-driven, error-repellant data validation techniques are, in selected instances, supplemented by

verification of certain critical data fields by a second, independent key station.

As an alternative, and to avoid pointless re-keying, by reference to the same source document - which only ensures that the second keyer has faithfully transcribed a possibly incorrect source document - certain transactions are keyed just once but released only after independent, aight verification and authorisation ensure that key elements of the accepted data are in accordance with the original, authorised, customer instructions.

In the final analysis, as I am sure Gilb would agree, there are some "errors" - whether accidentally or deliberately caused - which can, even today, best be detected by the human eye. For example a £1 million Swift transfer due to one account holder could, by a simple keying error, be credited to another (valid) account.

In an age where such trans-

actions cause funds to be made instantly available in other continents, the highest levels of transaction security are justified. Such modifications, together with errors in setting up critical standing data, would be difficult to prevent or detect by any of Gilb's 13 listed alternatives, other than number 12 (let the customer spot the error) which would certainly not earn a great deal of respect (or future business) from the plaintiff client.

To conclude, verification - as a means of providing error detection is, in most instances, out-performed in terms of effectiveness per pound spent by the more sophisticated error-repelling controls now available to the designer of online systems. However, in terms of fraud prevention/detection, and particularly in certain low volume/high risk applications it still has a justifiable place.

RONALD J. WARMINGTON
London

SOFTWARE FILE-1

Hardware economy in DME option for ICL 2972s, 2976s

FURTHER details have been given by ICL on the new facility which enables a 2960 order code processor to be combined with one of the new 2972 or 2976 systems (CW, June 15).

The facility enables those users converting to a large 2900 under VME/B to economise on hardware by getting rid of their 1900 or System 4 hardware at once. By installing a 2960 order code processor, which costs about £188,000, users can run unconverted applications under DME on their 2972 or 2976 configuration.

This is possible because the 2960, 2972, and the new version of the 2976 all use the same store access and store multiple access controllers and the same main memory. A 2960 processor installed alongside a 2972 or new 2976 can thus be allocated a host of the resources of the host configuration.

In this way, the configuration can be running VME/B and DME simultaneously, though the two systems are at all times functionally independent.

As the VME/B workload grows, users can switch an increasing portion of the storage

subsystems (SACs, SMACs, discs) from the 2960 to the 2976 processor.

In line with many manufacturers, ICL restricts the extensive use of microcoding to its larger machines, the 2950 and 2960, opting to hard-wire the large 2970 and 2980 systems.

The benefits of DME, a highly efficient microcoded emulator have thus been denied so far to 297X users, who have had to make do with Meep. A software emulation facility, Meep is much less efficient, is appropriate only for small workloads and is not attracted very little use.

The new option to attach a 2960 order code processor offers a significantly easier path to 2900 conversion than was available before and should help considerably to increase the appeal of the larger 2900s.

Interestingly, the announcement coincided with the release of DME+, an enhanced version of DME 1900 for the 2960, which offers a 25% improvement in performance (CW, June 15). However, nothing seems forthcoming for 2970, older version 2976, and 2980 users, who are stuck with Meep.

Transaction monitor for DG minis from Leasco

A TRANSACTION processing monitor has been developed by Leasco Software to run on Dnto General minicomputers under the RDS operating system.

Called MRTMS (Mini Real Time Monitor System), the first copy of the software has been installed on a Nova 3 at a bureau in Amsterdam.

MRTMS supports a transaction application modules written in a specially designed programming language. Offering high-level language features integrated with DG macro assembler, this language is said to combine efficiency with ease of use.

In common with most purpose-designed TP systems, the monitor includes terminal

control and security features and a built-in restart and recovery routine.

The software also provides a file manager, intended to protect database integrity, and full test routines for hardware and software errors.

An interesting feature of the monitor is its provision of a training mode. Designated terminals will in this mode simulate live system responses without updating application files.

Leasco has installed MRTMS at the Amsterdam bureau operated by Storkdata, the computer services subsidiary of the Vmf-Stork group.

Following this first site, it is to supply a complete real-time sales and purchasing system based on MRTMS to another Stork company, Stork Werkspoor Diesel.

This system, based on a Nova 3, will eventually support 15 VDUs, five printers, and a database of around 80 Megabytes.

Leasco's work for Storkdata follows a co-operation agreement signed by the two companies in April of this year.

Bureau taken over

THE Chichester-based bureau and software house, Jackson Associates, is to buy Scope Computer Services, Southern Construction's bureau. The sale will include an NCR Century 1A will provide Southern Construction with a bureau service, as well as systems design and programming for Southern's minicomputer, which will eventually replace the bureau service from Scope.

Leads office

TO support its increasing customer base in the North Megabyte, the Leeds-based real time computer suppliers have opened new offices in Leeds at Kerry House, Kerry Street, Horsforth, Leeds LS18 4AW. Tel: 0532 552865.

SOFTWARE FILE -2

Intensive format for delegates

AN annual event, the Inter-University Computing Colloquium brings together representatives from both computer science and computer services departments throughout the UK. Attended this year by over 200

delegates, the three-day colloquium is valued chiefly as an opportunity to exchange ideas. Intensive in format, the programme this year included nearly forty papers on topics ranging from microprocessors to regional computer networks.

Language-orientated research is main concern

THE predominant concern at Lancaster University, host to this year's Inter-University Computing Colloquium, is language orientated research.

The university is probably best known for the development

of a Pascal system for Data General's Nova minicomputer. Based on the Pascal P compiler, this software has been distributed to around 100 sites worldwide.

The heart of the system is a P-code interpreter, which is

written in Nova assembler and occupies about 2K of memory. The system in addition includes a monitor program, written in Algol, and a Pascal program, for assembling blocks of P-code.

Designed for Novas without hardware multiply divide or floating point features, the software runs under RDS and is intended for a minimum 32K environment. Although both the compiler and user programs are executed interpretively, execution speeds are in general comparable with those of programs processed by Data General's Algol compiler.

The system is distributed, at nominal cost, by Lancaster University in the UK and Europe, and in the US by Gamma Technology at Palo Alto.

Work is also under way at Lancaster on a general theory of languages, both programming and natural. Led by Professor Higman, this effort is in part directed at advances in compiler writing, possibly leading eventually to a "natural" programming language.

One unusual project is the development of a language,

Blazon, for text processing and picture reconstruction. This has been applied to the generation of heraldic devices from definitions of the constituent symbols.

Other work at Lancaster, also involving the development of a language, includes a project on information retrieval from library type structures, and the application of finite state automata theory to the design of communication systems.

● Lancaster is to take delivery of an ICL 2960 early next year. Replacing a 1905F, the new machine will form part of the North-west Universities' Regional Network, which currently includes mainframes and communications equipment at the computer centres of Lancaster, Liverpool and Salford.

Trebled its sales

OVER 80 sales of the TPS (teleprocessing monitor) in the last year have helped Teletime to treble its annual turnover. Results to the end of September are expected to show revenue of £1.2m for the year as opposed to £398,000 for last year.

'Mathematical content is underestimated' -Dijkstra

PROFESSOR Edsger Dijkstra, renowned for his original thinking on structured programming, spoke last week at Lancaster of the inherent difficulty of the programming task.

"The analysis of the programming task as carried out over the last 10 years has shown it to be more difficult than we thought," he said.

"This recognition began at the 1968 Nato conference at Garmisch, when the software crisis' first openly emerged. From that moment, programming methodology became an explicit topic of concern."

"The only fruitful way I can now regard programming is as a branch of applied mathematics. And what is said and done, it is one of the more difficult branches, as it also implies a knowledge of engineering."

Professor Dijkstra noted that he was not unique in concluding that the mathematical content of programming had been underestimated. One who shared his views, for example, was Professor David Gries of Cornell University.

Professor Dijkstra emphasised that he was not referring to mathematical programming or numerical methods. Nor was he referring to a mathematical "bag of tricks", vast areas of which were irrelevant to a pro-

grammer.

Implying that what he had chiefly in mind was the mathematical expression of program requirements, Professor Dijkstra was speaking primarily in the context of the use of invariants.

Earlier in the day, Professor Dijkstra had devoted most of his formal address to the use of invariants in developing algorithms. This he clearly regarded as a key technique in the development of evidently correct software.

In response to a query on the application of such techniques by people of lesser ability, Professor Dijkstra said that the connection between mathematics and programming had never been refuted. But it had been very widely rejected for its unattractive social consequences.

"Of the enormous number of programmers in the world, a large proportion was lured into the profession when the demands it has to make were grossly underestimated. This has been a source of personal tragedy for many people."

He added, however, that although over the last 10 years his greatest disappointment had been in this area, there were now signs that programming quality was rising steadily.

Methods 'too abstract' taunt for Professor

PROFESSOR Dijkstra's reverence for the abstract and his scorn for mechanical aids led more than one delegate to describe his approach as "Zen and the art of software".

His practice in general, he said, was to delay committing ideas to paper till as late as possible. This discipline, he suggested, offered one the best chance of mastering complex material as well as avoiding mistakes.

On the use of terminals, he said: "I never prepare my programs as a terminal because it is too easy to correct mistakes. Any medium which makes it easy to correct mistakes, encourages mistakes."

Advantages of using cheap micros in campus networks

CAMPUS networks, usually thought of as providing a local "ring main" of computing power, were a topic of universal interest at Lancaster.

Most of the attention focussed on the use of cheap microprocessors in such networks, either as network nodes or as switching devices.

Much of the attraction of such a network is economic, as minimum configuration "personal" systems can share occasional access to more powerful processors and peripherals elsewhere in the network.

A well-received presentation on such a system was given by John Buxton, of Warwick University. He described the

"For this reason, online systems should, I think, penalise stupid mistakes by increasing the reaction time a little after each error is made."

In a similar vein he argued that compilers, while implementing as many checks as possible, should stop as soon as the first syntax error has been found.

The austerity of some of Professor Dijkstra's ideas, particularly on formal design methods, prompted one member of the audience to question their relationship to the real world.

"I have learned to regard statements about the real world as an invitation not to challenge someone's tacit assumptions," Professor Dijkstra replied.

A TMS 9900 microprocessor had been used in this system as the switching computer. Initially linking a PDP-11/44 and several V11/03s - the latter equipped just with floppy disc. The system was eventually to be extended to connect about 15 other machines, including a Burroughs B6700.

Other delegates expressed interest in using modems in conjunction with the internal telephone system to implement the network. The approach, they noted with pleasure, would leave them free from interruption while they were connected.

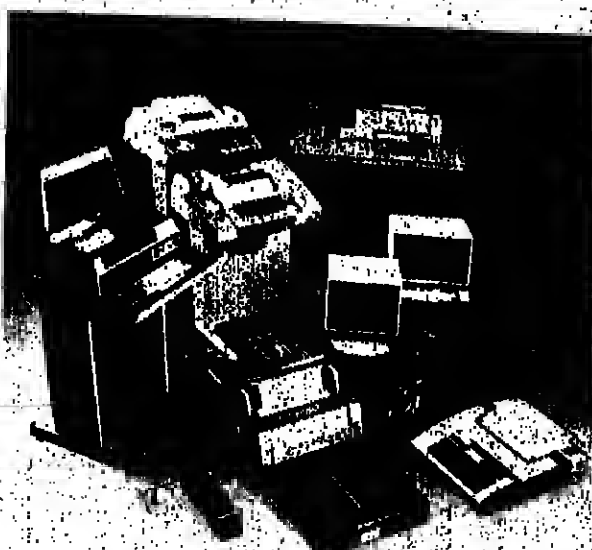
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PROGRAMMER NOTES

Labour costs force employers to look for predictability

OVER the past few years computing has emerged from a fine art to a non capital-intensive industry where the major cost is now people.

This minor revolution has made hardware so inexpensive in proportion to people costs that now management wants different programming skills from five years ago.

Generally an applications programmer will not now be recruited for his skill of cutting three milliseconds off the timing of an algorithm. What the manager wants now is predictability.

Predictability has two aspects: speed and, arguably less important, quality. Basic quality requirements would be that a system works, but efficiency, when there is computer time to waste, is less important in the words of one business systems programmer, "manager efficiency takes more time,

whereas my aim is to meet deadlines as a profit."

So, for many managers, a programmer who can produce a working program within the given time period, albeit with a few minor bugs to be ironed out, is just as valuable as an established programmer. But business apart, what qualities and experience is the successful candidate likely to have?

Sex discrimination is out. One manager even thought: "Programming is a woman's job." To be fair, he also felt that women tended to be more consistently prone to flashes of inspiration and hard work.

The successful job applicant is likely to have proven experience. Ideally the candidate will have followed a project from inception to completion and be familiar with those parts

he was not even directly involved with writing.

The essential quality is a logical approach. After all it should take just a few weeks to retain a good programmer in the basics of a new language; the subtleties can be learned with time. But too many programmers still think that with two years of Cobol programming, the job-market is their oyster.

A short flow-chart test of the interview will pick out the programmer who's only learned a simplistic problem-solving approach - rather than the true programmer who is relied on to contribute ideas and to fully organise his own code.

The candidate who claims Cobol, or other language experience, should be asked a few trick questions - eg. should switches or data comparisons be used in a Cobol program?

OP SPOT

Opcomm undeterred by lack of support

WHEN Opcomm arrived on the scene last February, there seemed every possibility that it would develop into an organisation capable of raising the status accorded to operations staff.

But the Coventry-based group has experienced difficulty both in terms of recruitment and persuading its members to attend meetings on a regular basis.

Can the group solve these problems and go on to fulfil its considerable potential, or is it always to consist only of a small band of operators who have sufficient drive to carry on with little support?

The latter now seems the more likely answer, after a talk I had with Russ Iwan and John McGinn, following a meeting held at Lancaster Poly in Coventry last week.

Hevan said, "We now have a hard core of half a dozen or so members who came to every meeting, and others who attend now and again."

Searching for reasons for the poor attendance, he continued: "The fact that operators have to work shifts doesn't help matters, but perhaps we have been too slow in putting ourselves forward."

Its first project was to carry out a survey, commissioned by Computer Weekly, into the computer room environment. This involved contacting over 40 sites in and around the Coventry area.

At present the group is engaged in formulating what it considers to be a training programme necessary for all operators. Much of the work is being carried out by Dave Charles, a shift leader at the Warwick University site.

In that regard, John McGinn said, "Admittedly, progress has been a bit slow at times, but great care is necessary if we are to produce something of quality."

"We want to stress that operator training and career progression are interrelated."

The group is also greatly interested in microcomputers and the effect they may have on the role of operations staff in the industry.

Said McGinn, "We are very interested in how they might alter the work performed by operators."

Recently the group has contributed to a book on computing which is to be published later this year.

The dos and don'ts of HOLDING jobs

IF operations staff make good use of their technical knowledge, the operating system will sometimes offer a number of ways of overcoming a difficult situation.

I say this after considering some of the comments made in a letter from Sam Saxton, who is a member of the operations support section at the Coventry site of Massey-Ferguson.

He writes in response to an Op Spot in which I attempted to show how an operator, in the IBM OS/VS environment, might use the operating system facilities. In order to maximise throughput and ease his task (CW, July 27).

On that occasion, to simulate a "difficult situation," I described the predicament of an operator alone in the computer room, with the system claiming for discs and tapes to be mounted, and "demanding" stationary changes on the printers.

To save the unfortunate operator having to run around in circles, I suggested that he might use the OS/VS HOLD and RELEASE commands in the following manner:

Firstly, he should use the

HOLD command in order to stop the system taking work from the input queue and transferring data from the output queue to the printers.

Then he should RELEASE all the input queues which, according to installation standards, will not call for any tapes or discs to be mounted.

After this, he should consider the jobs which will request tapes and discs and reorganise the queue to ensure that those using the same media run in sequence or concurrently. Then RELEASE the queues.

According to Saxton, "Holding jobs can be a rather cumbersome procedure at times; it is better to modify the initiators to reflect the job mix that can be handled at the time."

Qualifying that viewpoint, he continues: "This, of course, assumes that the job class specified matches the resource requirements of the job. If it does not, the operator should try to get it mounted."

He adds that re-arranging queues "should be normal procedure and not just a special technique to be used when under attack."

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By Bernard Allen

Perks, essentials—where should the line be drawn?

"OUR control room staff work a 7am to 4pm, 1pm to 7pm shift pattern over a five-week period and receive a 7½ per cent shift allowance."

"The operators get a 17 per cent allowance for working a three-shift rota. For this my senior operator—who has over four years' operations experience—gets a basic wage of about £80 per week."

So writes a shift leader in response to an Op Spot piece in which I attempted to outline some ways in which the wage paid to operations staff might be linked to the work carried out by them.

In this regard he says: "Now, I do not work for a company in private industry, and the workload is pretty uniform with a fair amount of spare machine time."

"However, this does not mean that we are allowed to terminate the night shift when the work is completed. Instead, we have to wait until the day shift arrives, even though there is nothing to hand over to them."

Meeting operators from other installations has made him view his own site in an even poorer light. He continues: "Speaking to engineers and operators from other sites, I realised that some operators get 'perks'. These sometimes include training schemes, cheap mortgages, a rest room, cooking facilities, club rooms, and others."

"We, on the other hand, are not even considered to be essential car users and therefore cannot get car loans."

He concludes in a manner which sums up the mood of the letter. "At this point you are probably wondering why the installation is manned at all. Speaking for myself, I suppose I have got into a comfortable rut and my family enjoys the area in which we live."

Well, unfortunately his description fits too many installations. I consider some of the things he refers to as "perks" as being essential in the lives of computer operations staff. Let's consider some of them.

Rest rooms. Last week in Op Spot I said that operators must

have a place to which they can escape from the noise of the computer. I still hold that view.

Cooking facilities. These are essential for staff working the evening and night shifts. Snacks from a vending machine are all right, but are no substitute for cooked meals.

Training schemes. It goes without saying that training is vital if staff are to function at an optimum level and have a degree of career progression.

Reduced mortgages. Many financial concerns provide these for staff who are married and over a certain age. In my view such "concessions" give the company a hold over its employees.

Club rooms. While I do not consider these to be essential, I do feel that they provide a pleasant break for staff, particularly those working the evening and night shifts.

Finally I would like to consider some of his other comments: those on car loans and remaining on site during the night shift even though all the work has been completed.

Well, if operators working shifts are not essential car users, I do not know just who does fall into that category. Too few will consider the problems staff face in getting to and from the installation.

I can see no point in making the whole shift stay on site once the work has been completed, although one or two of the staff must stay behind to hand over the day shift. The shift leader should be in a position to drive up on rota so that everyone gets a turn in carrying out this task.

Operators often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 1JU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-281 8035.

HINT OF THE WEEK

Use macro to save typing

THE use of macros in the ICL George 3 environment is the subject of a hint sent by Terry Stevens, a shift leader at the Brighton site of the University of Sussex.

He says, "By using macros, the operator can save himself a lot of typing when he is responding to system requests."

According to Stevens, when job running under George 3 requires a printer to be engaged, or allocated, it will give the operator the following message:

PLEASE ENGAGE UNIT U14

If the operator is unable to allocate the printer, for example, because of a paper wreck, he must type in the following reply:

CD ENGAGE UNIT U14

Says Stevens, "To save typing this in every time a macro should be used." He gives the following example:

INPUT : MACROS, CD14

CD ENGAGE UNIT U14

EX

Says Stevens, "Once this has been done, the operator has only to type 'CD14'."

He also points out that macros may be put to good use in relation to the alignment of pre-printed stationery. For example, to ensure that the line-up of pay slips is correct, the system might give out the following message:

SALARIES, PAYRUN, ARE PAYS LIPS ALIGNED OK?

In response, the operator must enter the following:

SALARIES, PAYRUN, YES or NO

He puts forward the following macro:

INPUT : MACROS, PAY

AN : SALARIES, PAYRUN, % A

EX

Says Stevens, "After this has been added to the macro file, the operator has only to type 'PAY Y (or N)'."

Away from noise and bustle

WHILE visiting the Swindon installation of W. H. Smiths, I was very impressed with the rest room provided for the operations staff. In addition to the room itself, there is an area where food can be prepared and cooked.

In my opinion, all sites should provide such facilities so that the operators can spend their breaks well away from the noise

of the computer room, particularly during the evening and night shifts.

However, too many sites fail to pay attention to this matter, with the result that the operators are forced to visit the local public house in order to get a break.

What facilities are provided at your site? Op Spot would like to hear from you in this regard.

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PO test service ready to go live

THE two GEC 4082 minicomputers which will soon form the basis of the Post Office Prestel test videodata service, went live last Wednesday. After three days of testing, the computers were handed over to information providers on Monday for data to be updated and, as soon as this is completed, the test service will be switched from the 4082s at Martlesham to the 4082s at Gresham Street, London.

Sets for the first 50 users, who are due to go on to the system by

the end of the year, have now been received by the Post Office and the first six of these, installed in selected homes, are currently being serviced by the research installation at Martlesham. The first 30 lucky users have been nominated by the television manufacturers.

A copy of the Martlesham database was transferred to Gresham Street in mid-August, and has not been updated since. Information providers, therefore, need to bring their pages up-to-date before the system

goes live to users.

It had been hoped to get the Gresham Street centre on the air sooner, but delays were caused by teething troubles with the software, which has been enhanced with several additional features including access charge data.

The information providers have now responded to the Post Office's proposals for the scale of charges once the service goes public next year (CW, August 17). The information providers regarded the initial Post Office proposals as unacceptably high, and a compromise acceptable to both sides is likely to be reached within the next few weeks.

Bell-Northern Research of Canada is working on a rival to the Post Office Prestel videodata system. Called Videotex, the Canadian system is to be given a market trial in 1980. A variant is under development which would allow users to send messages to each other's TV sets without going through the central computer.

Agency to show off British products

A NEW agency selling UK-made terminals and microcomputer systems under its own marque will be exhibiting its product range publicly for the first time at the Institute of Directors on September 29.

The firm, Computrade of Leatherhead, was set up by consultant Tim Wickes to market equipment from British manufacturers who do not have large enough sales staffs to give wide coverage.

Featured at the exhibition will be a desk-top portable computer system based on the Digital Equipment LSI-11 processor, with the name Compact 5. Other products on show will be portable hard-copy terminals and VDUs.

In addition to selling manufacturers' existing product lines, Computrade also designs new systems based on these, adding extra features to units, combining hardware from different sources, and encouraging

firms to co-operate to make new enhanced products.

Computrade buys equipment in bulk from manufacturers (British where possible) receiving appropriate discounts, and either sells it itself or appoints other agents around the country. Many small UK manufacturers, Tim Wickes points out, have only one or two salesmen, and thus have difficulty competing against big overseas firms even when their product is superior.

"To build a strong British computer industry," he says, "we have to go into the international markets and meet the foreign competition head-on and sell. This is our major aim." Otherwise, he adds, there is a danger that the UK computer industry could go the way of the motorcycle business.

Anyone who would like to visit Computrade's exhibition should telephone, Claire Hanks, on 03723-77374.

H-P offers System 35

OFFERING an alternative to minicomputers for high speed computation and instrumentation, Hewlett-Packard has introduced a desk-top computer, the System 35, that adds assembler language facilities to the basic programming provided by the existing H-P System 45 desk-top machine.

The performance of the System 35 is also enhanced by random access memory that can be expanded to 256K bytes.

The System 35, lacking the graphic display and reporting capabilities of the System 45 but comes with an alphanumeric VDU and a 10-character thermal strip printer.

The assembler is a plug-in ROM-based option not available on the System 45 and enables System 35 to be used to process inputs at high speed from a variety of devices via a selection

of I/O interface cards. These include RS-232-C, real time clock, 16-bit duplex, BCD and plotter cards.

The System 35 comes with four slots into which ROM modules holding the assembler and the required I/O controllers can be inserted.

The module for assembling and executing programs costs £1,200, but H-P can also supply an execute-only module for £250. This module should be attractive to system house clients who want to sell machines that can execute their software while preventing their customers from modifying it.

The smallest version of the System 35, with 64K bytes of RAM and a 217K byte magnetic tape cassette unit, costs £8,458 with a VDU or £8,749 with a 32-character angle line display.

Stock control at PoS

A POINT-OF-SALE system, based on a micro, which uses virtual memory techniques has been introduced by Ego Computer Systems primarily for stock control applications in the motor trade.

Already about £100,000 worth of orders have been received by Ego and some interest has been shown by British Leyland.

Built around the Motorola M6800 microprocessor, the system is stand-alone and in its simplest form consists of the processor, with a minimum of 32K disc storage, a specially designed VDU, and a printer.

system is one of low cost; the standard system being priced at £8,750 including user software. Storage available ranges from 32K up to 12.5 Mbytes.

The VDU has been designed for easy operation by unskilled users and two keyboards are available. One is the standard Quartz style layout and the other is based on the normal ABC sequence.

Typical information that the Ego system can handle includes part numbers, prices, stock listings, records, invoicing, sales analyses, and re-ordering.

Software is written in Ego, originated assembler but development of a Basic program is under way, as the company is intending to promote the system as a general PoS package.

Crash progress

● VERY encouraging performance of its ICL 2980 and a smooth transition to the 8K27 version of VME/B have been reported by the Edinburgh Regional Computing Centre in its newsletter for September.

In the four-week period ending in August, the system achieved a downtime between hardware crashes of 27.8 hours and a downtime between software crashes of 18 hours.

Experts meet to combat crime

A THREE-DAY conference entitled Science and Security dealing with possible scientific solutions to security problems was held in Brighton last week.

The conference, attended by about 150 delegates, was opened by ex-Premier, Sir Harold Wilson, who visited a number of exhibition stands set up in conjunction with the conference.

Organised jointly by the Institute of Physics and the Electrical Research Association, the conference included 40 papers from scientists and security experts from the police, the government, universities, computer installations and the security industry.

These papers were presented under one section headings and among these were intrusion detection and alarm, encryption, explosive hazards, and access control.

The photograph on the left shows Sir Harold Wilson talking to staff on the Flexion Engineering stand.

Computel link-up

THE deal between the Central Electricity Generating Board and Computel, under which the latter will run a CEGB-owned ICL 2970 at its Bracknell computer centre on behalf of the Board has been completed (CW, September 14). As expected the CEGB regional centres will use the 2970 for software conversion while Computel bases its VME/B bureau services on the machine.



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Aviation and Communications Systems and Services

CONFERENCE REPORT

In answer to a question Frank said that IBM's Satellite Business System operation was "basically incompatible with SNA, and further it had just suffered a setback when its license was overturned by a Federal court on the grounds that the FCC had not held a public hearing before granting the license.

Frank disagreed with session chairman Herb Grosch, who suggested that host computers were necessary on a network. "There was to be any traffic," he said, was an example of a major business with no hosts on its network.

High speed Z80A analyser launched

ANNOUNCED at Weston last week, the Z80A Microsystem Analyser or USA from Millennium Systems of Cupertino, California, is now available in the UK from Microsystems Services.

Though Z80A based, it can also be configured to test 8080 or 6800 based systems, with 8085 emulation to be added by the end of the year. Each additional emulator costs £887 and a "signature analysis" option for £569 allows checking of bit streams at individual nodes in a system.

The USA emulates the processor by plugging it into its socket in the system under test and it is claimed to appear in the system exactly as the processor chip, without any extra noise or delay, up to the full 4MHz clock rate of the Z80A.

Customer written diagnostics loaded in PROM into the USA

can set hardware breakpoints, allow single-stepping through programs, and alternate register, memory and I/O location contents to direct hardware or software faults.

This data can be displayed on the unit's 20 character, 16 segment alphanumeric display, or a show.

Light enough at 21 lbs to be used in the field, the USA is also included as a laboratory aid or production test instrument.

The £2,574 system provides a high degree of emulation transparency for the Z80A micro. According to Larry Badgley, vice president of technical development at Millennium, the chip has several problems in emulation, mainly because of its high, 4MHz operating speed. For emulation to work, the system must see the analyser exactly as

it sees the CPU chip, Millennium reckon to have achieved that degree of transparency.

A multi-user development system for 8080A and 8085 based products produced by muPra, that has been sold by Microsystem Services for over a year, is now available on short term hire for £100 a week. Also made in the US, the muPro 80-ED is floppy disc based and can be used with up to four terminals for program editing and debugging using the BSAL-80 assembly language. Far hardware checking, it functions as a self contained in-circuit emulator, plugging into the processor socket and controlled from the 23 key front panel.

Value of home market confirmed

CONFIRMING the recent Computer Weekly survey of the personal computing market (CW, August 24), the new magazine Practical Computing predicts a "home" computer market in the UK of £7.5 million in 1979.

Practical Computing spoke to over 40 suppliers of personal computing equipment who estimated that there are already about 5,000 home computers in Britain, defining "home computer" as a system costing less than £1,250 and used typically by small businesses, hobbyists and educational establishments.

Of this market, it is estimated that about 4% are in use in educational applications, 25% in companies with a turnover less than £500,000 and 16% by home hobbyists.

In the Computer Weekly survey, the total current market was estimated at about £5.5 million rising to £7.5 million in 1980. Practical Computing said it believed the £7.5 million estimate in its survey veered on the side of the pessimistic estimates and believed the market could be even greater once large companies like IIT made a full impact on the market.

Practical Computing, which aims to cover the business, hobbyist and educational application of small systems, is available from bookshops throughout the country, price 50p. Further details can be obtained from Practical Computing, 2 Duncan Terrace, Islington, London N1, 7BN (01-278 9517).

Comart looks to new horizons

THE Horizon Z80 based micro-computer from North Star of Berkeley, California, is being launched at the Personal Computer World Show this week by its UK distributor, Comart.

Selling in kit form for £995 or assembled for £1,285, it features an integral mini floppy disc drive, an 10K of fast RAM in a 72 pin 4MHz mother board. North Star's basic release 4 and Disc Operating System.

Comart has a promotion agreement with North Star, and is looking to develop a UK network of agents and dealers for the system.

IT is generally agreed that one of the most important aspects of Britain's response to the "micro revolution" is to gear industry to understand the potential range of applications of the devices.

As an stimulus to the education of non-technical management in appreciating the potential of the micro, the Department of Industry has instigated the MAPCON scheme which helps to pay the

Edited by Martin Banks

fee of consultants who are educating and advising companies on applications. Here, BRIAN BENSTER of Maktronik Consultants, of Axtley, Manchester, one of the authorised MAPCON consultants, describes from personal experience the best way to run courses which explain the micro principles without becoming bogged down in jargon.

Courses for newcomers

INFORMATION on micro-processors is abundant. Introductory articles for the newcomer (see there any newcomers left?) aim to explain the technology in simple terms. Seminars by manufacturers and universities serve to update engineers and computer personnel on new techniques, technical developments and newly-introduced devices. Such information is readily digested by the professional and also by the hobbyist. What qualified, self-respecting engineer or programmer hasn't taken some steps to further his knowledge of micro-processors?

If the opportunity doesn't arise at work — or cannot be made to do so — then self-education might be the result. Literature is sought and pored over and possibly some hardware is purchased. Important as engineers and programmers are, it is senior

wants something simple and geared to the implications, effects and results, that is, the effect not the cause. Any courses run specifically aimed at managing directors, senior managers and the people who sign the cheques to buy microprocessors or implement micro-based schemes should have clear-cut objectives.

A tremendous amount of effort must go into cutting the jargon down to half a dozen terms. The subject then must be considered from the managers' viewpoint — what microprocessors will mean to him, what it will cost and what will be involved.

The course should serve to explain the present day importance of micro and why they are causing such a revolution. The essential features of a micro-processor and what it is and does should be discussed in the simplest way possible, backed

audience so that the course progresses slowly and simply. Add it must encourage managers to ask the questions that have been at the back of their minds, but which they have been afraid to ask.

Add to this a variety of visual aids and demonstrations and you have an easy to understand introduction to microprocessors for the non-technical decision maker. The techniques to show are simplicity, only the most essential technical details are introduced and even these are kept to an elementary level.

In our experience, once someone pushes the buttons to make the lamps light, the interest really starts. If this theme is developed, the managers will want to continue the next day with their own equipment, their industry and, with "their" ideas.

Our experience from a considerable number of courses has



Brian Benster of Maktronik Consultants teaching the "micro revolution" to the uninitiated, under the Department of Industry's MAPCON scheme.

management which must make decisions on future policies, whether to delve into micro-processors or not and what line to take. Often the very enthusiasm of engineers is seen by managers as a disadvantage — is it a new toy or not? To the manager it doesn't even matter if it's CMOS or TTL.

There are not many managers, though, who can dismiss micro in such a way. The technical press is full of these devices, the Department of Industry is spending £70 millions on new projects by authorised consultants scheme (CW, September 14) and great store is being set on the new store by the Silicon Valley.

Microprocessors do present a problem, however, for non-technical managers. Software, chains, vectors, interrupts and nibbles confuse up vision of a highly complex and involved subject. What the manager

by illustrations and examples of typical applications so that the points made can be easily understood.

Finally and most important, the whole subject should be reviewed in terms of possible applications within the plant or industry, with which the managers are concerned. It is at this point where theory and practice relate themselves to one another and where new applications become apparent.

The course must be imparted impartially to the use of micro-computers. To alternatives, impartial to any particular product that may be under consideration within the company and impartial to any particular microprocessor or micro-processor based equipment.

To these essentials the following features are highly desirable: The course must not try to sell anything; whether it be a microprocessor or some other equipment. It must exclude technical people from the

led us to believe that the objectives can not be accomplished. Only if such a seminar were conducted by a company's own personnel, even though this expertise has been available in many of the companies that we have visited.

To the professional and enthusiastic engineer or programmer who feels that his managers do not quite grasp the point of the micro revolution, of being too slow to act, why not introduce the idea of a course? There are far more applications for microprocessors which are waiting to be discovered than have been discovered so far. One forecast is that only 10% of possible applications are known at present.

And if your manager responds "Our competitors aren't doing anything yet", ask him if he instructs his sales force to wait outside prospective customers' offices until he sees his competitors arriving.

DP salaries lag behind average

SALARIES in data processing have risen less in the last year than the national average, according to figures in the new edition of the Computer Users' Year Book. DP salaries rose by 11.8% an average during the year ending May 1978, compared to a national increase of 12.5% over the same period.

The Year Book also points out that in the 10 years since it started publishing, computer usage in the UK has grown tenfold and hardware costs have fallen eightfold. It arrives at these figures by noticing that the 1968 Year Book records 5,000 terminals with modems in use, whereas the figure today is 52,000.

The Year Book estimates that a small business system costing today around £20,000 is the equivalent of a 1969 machine costing £50,000. Allowing for a three-fold drop in the value of money, this would mean real hardware costs have gone down eight times. This has been offset partly by rising costs of software.

The salary figure for DP comes from a nationwide survey of 23,000 employees carried out by the Year Book, while the national figure is from the De-

partment of Employment. Looking at specific jobs in DP, only increases for senior programmers (13.1%) and senior operators (12.6%) were higher than the national average, while DP managers' pay went up by 10.45%.

Opersters had the lowest increase, at 8.19%. Staff turnover was 14.9% an average, and overall growth in numbers of staff was 2.52%.

Looking at other changes over the last ten years, the Year Book notes that the number of installations it lists has gone up 171%, while the number of actual machines has increased 375%. The largest increase it gives is that in the number of consultants and software houses: 614%.

The tenth edition of the Computer Users' Year Book, now an annual publication, incorporates several new sections in addition to its traditional directories of suppliers and installations. These include a survey of computer networks, together with a prognosis on their development world-wide, an article on personal computing and a classified bibliography.

A unified index to the whole book has also been added to help readers find their way through

the large number of sections. The equipment tables have also been extended to include micro-processors and add-on and replacement memory.

In its 10 years of life, the Year Book has become well established as the UK's principal reference work for the industry. As well as listing installations and equipment suppliers in considerable detail, it lists service bureaux, consultancies, training organisations, and so forth. There are also tables of information on standards, character codes, salaries, telecommunications costs, and the like.

Detailed examination of the tables, particularly that of word processors, will find errors and omissions, but the Year Book retains its popularity through the industry as a whole.

*The Computer Users' Year Book 1978, 1018 pages, £21.95 plus postage from 430 Haddenham Road, Bournemouth BH18 8AA (0202-301130).



Designed in the US by Racal-Dana, this Series 8000 microprocessor digital multimeter uses a 8802 microprocessor to calculate and record minimum, maximum and average values of voltage, current or resistance. Analysis is based on up to 9,999 readings taken at a pre-settable sampling rate. Prices start at £1,995.

As well as these imports from the US, Racal-Dana has sold £80,000 worth of British-made instruments to the US Navy in an order for 60 Model 8008N modulation meters plus spares and service. These meters have been available for several years, and are supplied in a programmeable version for the British Army's Clesman communications project, as well as to other European defence forces.

Boom in services

THE latest Business Monitor statistics from the Department of Industry on computer services show that total business income rose more than 20% between the first quarter of 1977 and the same period this year.

The first quarter 1978 figure was £75.7 million, of which £20.7 million came from billings to parent and associate companies and the rest from outside business. The latter accounted for most of the overall increase in business over the 12-month period.

The Business Monitor breaks

outside billings down into billings to public service clients, to other UK clients and to foreign clients. Public service business increased from £8.5 million to £9.8 million, other UK business increased substantially from £31.2 million to £40.8 million, while overseas billings amounted to £4.3 million in the first quarter of 1978 compared with £3.1 million the year before.

Consultancy business with foreign clients went up dramatically from £1 million to £1.7 million.

US foothold for C and W

WHILE reporting a pre-tax profit of £36 million on a total revenue of £177 million, Cable and Wireless chairman, Lord Glenamara, announced the company's largest ever contract for £200 million. Covering five-year period, the contract is for provision of a telecommunications network for Saudi Arabia and a training facility for the Saudi National Guard, which will operate and maintain it.

During the year Cable and Wireless bought three companies in the US, giving it a foothold in the telecommunications market there. "We value this market because it is the largest in the world and is the major source of leading edge technology," said John Bird, managing director of the company's Communication Systems and Services Division.

"With Carterfone, Incotel and TDX Systems, we have established ourselves in the US and

this is reflected in the division's revenue increase from £18 million to £29 million."

CSS is to manufacture a computer-controlled telex exchange from Plantronic of Santa Cruz, California, for which it has marketing rights for 50 countries outside the US, including the Middle East and Africa.

The major part of the company's revenue comes from operating public telephone concessions in foreign countries. It does not expect this to go on growing, so increasing effort is being put into turnkey telecommunications systems, assembled to order from suitable products on the international market.

Three directors retired during the year, including Jim Hodgson who was the last of the series of board members from the Past Office. Two new directors were appointed: Patrick Maaney of Thomas Tilling and John Salkeld of accountants Binder Hamlyn.

Siemens technical users

THE association of scientific and technical users of Siemens computer equipment, Wasco, is to hold its sixth conference on October 5 and 6 in Kiel, West Germany.

Wasco was founded in 1976 and since then has attracted more than 50 member installations. Working groups include those responsible for languages and program packages, the BS 2000 operating system, and computer centre management. More information from Mr

Notling, Universität Bielefeld, Rechenzentrum, 4800 Bielefeld, Germany.

Floppy disc order

IN a report of an order placed by Research Machines, Oxford, for floppy disc drives from BASF (CW, September 14), the value was incorrectly stated and should have read £100,000. We apologise for any confusion caused.

10a.m.



1p.m.



5p.m.



10p.m.



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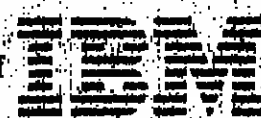
Operators will appreciate its simple JCL maintenance, its facility for automatic restart and its control of system usage, while to the end user it offers APL, BASIC and Fortran with a wide range of application packages for business management and project control.

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The New York Times

The Times... they are a-changin'

NEWSPAPERS are the oldest of the mass media, originating as they did in the printed sheets that in the sixteenth century circulated news of trading ventures around the financial centres of Europe.

They are also the most threatened, although they have survived surprisingly well through this century—albeit in greatly diminished numbers—despite the death knells that have been sounded for them at the introductions of radio, television, and now videotape.

Newspaper production has always been highly labour-intensive, and as sky-rocketing costs kill off large numbers of titles, those remaining are placing their hopes for survival on computers.

Arguments between management and unions in Fleet Street over "new technology" have been going on for years, and there is no end in sight.

Meanwhile, the most prestigious newspaper in the United States if not the world, the New York Times, has switched over entirely to computer composition after many years of planning, deliberation, experiments, and negotiating with unions.

During this year's Independence Day holiday weekend, the lost Linotype machine was closed down, to be replaced by computer-controlled photocomposers and banks of VDUs, operated by journalists themselves.

Computers linked to phototypesetters do not by themselves make enormous changes in the economics of newspaper printing; they provide greater flexibility and a variety of minor aids, such as sorting of advertisements and hyphenation of words at the ends of lines.

However, their great significance is that they make practical direct input of text by the writers themselves; thereby the compositors, who have always made up a large part of a paper's workforce, are eliminated altogether. The New York Times formerly had 900 compositors, proof-readers, and make-up-men, but will soon have only 350.

Traditionally reporters have produced their work on typewriters, and after marking up by sub-editors, the pieces of paper are carried by "copy boys" to the compositors who key the text over again on machines called linotypes. These



While Fleet Street newspapers vacillate over the introduction of "new technology," the grand old lady of the US Press, the New York Times, has completed the changeover to an entirely computer-driven printing system, with journalists taking over their keyboarding from skilled compositors. RORY JOHNSTON (pictured left) reports on this upheaval within the ancient crafts of the Fourth Estate.

generate the type as solid slugs of lead alloy, one per line. Now, all the typewriters and linotypes have been thrown out and replaced by 260 VDUs on which the reporters type their stories.

A network of six Digital Equipment PDP 11/35s receives the stories and stores them on disc. Editors call the stories up on other VDUs, make any changes that are necessary, add instructions as to headlines, type style and size, and then the stories go to one of five Matrosat photocomposing machines.

These produce typeset text on photographic paper at the rate of 1,000 lines per minute. The characters are generated by software on the face of a CRT and projected by a lens on to the paper.

The shape of the characters, in a whole range of different

typesets, are held in digital form in memory, giving enormous flexibility. The strips of paper, after development, are cut up by hand and pasted-up on boards to make up the pages.

"Cold composition," as it is called, is usually printed by offset lithography, in which the printing plate is a flat sheet of aluminium with a chemical coating carrying the image to be printed.

Indeed, the New York Times has a new satellite printing plant in New Jersey that will use this process. However, the paper already has a large investment tied up in its existing Manhattan plant in conventional letterpress equipment.

These presses use cast lead plates on which the image is held in relief. So that these machines can continue to be used, a process called Letterflex is employed to make plastic plates, still with the printing image in relief.

The pasted-up pages, including half-tone photographs, are scanned at 1,000 lines per inch by a laser facsimile system and sent four floors down the building where a "laser mask" like a photographic negative, is made.

Ultraviolet light is shone through this on to a steel sheet covered in semi-liquid plastic, hardening the plastic where it falls. The unhardened plastic is blown away with an air jet leaving a flexible printing plate that can be bent into cylindrical shape for the presses.

The facsimile process allows the pages to be sent by private radio link to the New Jersey plant, which prints special sections for the Sunday edition and can also back up the Manhattan presses.

Classified ads use a separate system of four Interdot 70 units to process their text input can come from OCR, so the paper's 70 outside agencies can prepare ads themselves on typewriters for direct input.

This has the added advantage of reducing errors, as the elimination of compositors on the editorial side.

The "Journalist" system is basically a Harris product, using their VDU and software, with

collaboration on the design from the Times' development staff.

Interestingly enough, there are some things which the new technology makes more difficult rather than easier. For instance, if a story is slightly too short to fill the space allocated, with hot metal it is easy to spread some of the lines further apart by inserting slivers of metal between the slugs. Cutting apart the lines on the photographic paper, and sticking them down again while trying to keep them straight and even, is a much trickier process.

The manual pasting-up of the pages may seem antiquated in the midst of all the surrounding advanced technology, but according to John Weger, the Times' director of R&D, no existing screen-based system would do the job to their satisfaction. One will come eventually, though, he is certain.

The printing unions did not agree to the changeover to new technology without a struggle. The contract for the current arrangement was signed in 1975, after many years of strife involving all the New York newspapers during which many titles, including the famous Herald Tribune, died.

The inexorable economics of the situation finally dawned on the unions, and they settled for an agreement providing sizeable financial inducements, staff reduction without sacking, but by attrition only, and retraining.

UK newspapers have hardly begun to introduce any of these changes, but there is little doubt they will have to do so eventually in order to survive. The most contentious issue is whether the journalists will protect printers' jobs by refusing to do direct keyboarding.

The NUJ has said it will, but in fact there is little love lost between journalists and printers (printers are paid considerably more on Fleet Street) and when it comes to the crunch things may look very different.

Mirror Group Newspapers has installed some computer-setting equipment, but as yet it is only being used on the weekly Revellie. There was a good deal of labour trouble when Revellie started to use it in February, which has now been cleared up. When the Daily Mirror and Sunday Mirror will start to switch over is not yet known, but it could be later this year.

The hot metal technology that is being replaced at the New York Times has had a good run for its money. The Linotype machine was invented by Mergenthaler in the 1880s and it is a tribute to him that it has survived almost unchanged to this day. Sadly, many printers' skills are being lost along with the metal type.

The NYT quotes Arthur Genge, a make-up printer: "To me it's no challenge any more. Editors used to come up and work with you. Does this fit? Can we make this work? You had a sense of artistry. You

were a craftsman. Now you paste it on the board. There's nothing to it."

Genge carries in his wallet the card issued to his grandfather by the International Printers Union in 1897.

William Msloney, a supervisor of proof-press operations, said: "It's too simple. I used to call this"—he pointed to the old composing room—"organised

confusion. But that's what made the job. This thing"—he nodded toward the new composing room—"is quiet. It doesn't have the rhythm, the flavour. It's like working for an insurance company instead of a newspaper."

"We were proud of being printers," said Ned Ferrall, technical supervisor. "I was proud. Now the computer does for you."



The new way: A journalist at the foreign news desk of the New York Times types in a story on one of 260 Harris 1740 VDUs.

WEEKLY electron

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Independents give Lomac a boost

THE top management reshuffle at Logical Machine Corp. of Sunnyvale, California (CW, September 14), is being well received by the many independent suppliers who are now the main outlets for the company's Adam small business system.

Lomac was set up in 1975 by John Peers, who was managing director of Allied Business Systems in the UK before going to the US, to produce and market Adam. Peers has now been superseded by Jerry Brandt in the day-to-day running of the company, and he is tightening up drastically on spending in an effort to get Lomac back on a profitable path.

Most of the Lomac sales force has left or been laid off and many of them have set up independent sales operations. One of these is Stan Bootle, another UK expatriate who was with Warrick University and Unilac before moving to the US. He joined

Lomac in its early days but is now selling Adam through his own San Francisco company, Adam-Ant Inc.

Commenting on the Lomac changes, Bootle said that he thought the simplicity of Adam had been oversold and this had resulted in some confused first-time users. Now, however, with independents such as himself giving more effective backup, the claim that Adam could be "plugged in like a toaster" was proving true for many users.

Bootle said that the software packages for routine applications which Lomac had been offering, to get first-time users off the ground, had proved very useful; but the promises made over software by some Lomac salesmen had given the company "considerable problems", according to Brandt.

However, users had made good use of these packages and had also developed many of their own. Bootle says there is an

active user group in the San Francisco area which is typical of several in the US and there is an active exchange of operating know-how.

Some users who are running out of capacity have installed a second Adam system, and floppy I/O which is now available has eased integration with other systems. Worldwide about 500 Adams have been sold.

However, the introduction of Able, the larger system that can handle up to 16 terminals, is now awaited. The company says that this will be announced "sometime next year". The hardware is understood to be ready, but software is still under development.

At the other end of the line Tiny Adam, or Tina as it is now known, is due to start deliveries next month and is being made available through the Byte Shop network of the Lomac subsidiary, Byte Industries. These shops are switching from hobby sales in selling assembled systems.



The Dataproducts printer ribbon manufacturing plant in Pinglas, Dublin (pictured above) is likely to exceed the expected production of 80,000 ribbons in its first full year.

Opened in February this year, the Dublin plant will be "key to the expansion of Dataproducts in providing a wider range of computer consumables", according to Jack Mole, director of European Marketing for Dataproducts supplies division.

WP workshop

WORKSHOPS on word processing for managers and supervisors are being organised by ICFC Training under the direction of Keith Wharton. Both workshops are being given twice: October 17-18 and November 27-28, at the Café Royal, London. ICFC Training is on 01-940 5555.

Japan to invest £70m in OS

THE Japanese government is to invest about £70 million over five years in developing operating systems to challenge whatever IBM may offer on its forthcoming E and H series.

This has been revealed by the Japanese Ministry of International Trade and Industry as part of its next five-year plan for the Japanese computer industry. This plan also includes offering tax incentives to help promote the development of unbundled software package sales (CW, September 14) and a five year investment plan of about £20 million for the peripherals and terminals industries.

The participating companies, which include Hitachi, Fujitsu, Mitsubishi Electric, Toshiba and Nippon Electric, will be expected to match the government investment, bringing the total programme for five years to about £160 million on software, peripherals and terminals.

In addition to the operating systems and Japanese high-level languages, the plan also stresses developments in distributed processing and memory techniques.

Interactive graphics system from Calcomp

A POWERFUL standalone interactive graphics system, the IGS 500, that can support up to four display stations and four digitizers has been introduced by Calcomp.

The IGS 500 is configured around a minicomputer with a main memory expandable to 256K bytes, and the software provided with the system includes a high-level language called Interactive Graphics Language. IGL enables the user to create his own application programs. Calcomp itself can supply applications packages for design and drafting and mapping management.

Each display workstation comes with separate alphanumeric and graphics displays, a digitizer tablet, a joystick picture controller and a local 64K-byte picture processor that can be used to manipulate a drawing

without affecting the other users of the IDG 500 system. Functions that can be performed locally include scale, zoom, blink, pan and rotate.

The basic IGS 500 system with one display workstation and a 50 Megabyte disc drive costs £55,000, and can be expanded with disc storage up to 1,200 Megabytes and a variety of other peripherals including the Calcomp 980 plotter.

Memory debut

THE bubble memory device expected for some time from Rockwell will be shown for the first time in Europe at the Electronics exhibition in Munich in November. The Rockwell device has a capacity of 286,500 bits and will compete with the 256K T1B 0303 announced by Texas Instruments last month.

Micro revolution

From front page

Information technology (CW, March 2).

The ACARD working party asks the Schools Council to examine how semiconductor technology will affect school curricula; the departments of education and employment and the Manpower Services Commission to develop appropriate courses to ensure that within five years shortage of appropriate trained staff is not a constraint on exploiting semiconductor technology; and the Department of Industry to coordinate efforts, costs about £5 million a year aimed at adult education and training in semiconductor applications.

The government broadly accepts these recommendations and says the departments concerned are "drawing up plans for early implementation."

ACARD also suggested that the Neddy working parties should make a systematic assessment of the impact of semiconductors in their industries.

On most of the other main ACARD recommendations, such as increased government aid to the micro-electronics industry and micro applications, the Department of Industry has already acted.

The call for a Royal Commission came from David Barnett, general secretary of the General and Municipal Workers' Union.

While he accepted a claim by employment minister Albert Booth that the micro provides the opportunity for the creation of new jobs, Barnett told Computer Weekly he did not believe that the new jobs would offset the number lost elsewhere.

Supporting the ACARD view, Barnett stressed that he believed the educational and training system was a key factor in finding a solution to the problems.

Security bulletin

STARTING IN November, a monthly bulletin entitled Computer Fraud and Security will be published by Elsevier International. Bulletins. This will cost £56 per year and will aim to inform management on the nature of computer fraud and techniques that can be used to combat it.

Head of the editorial advisory board will be Michael Comer, who is an experienced advisor on security to government and private companies.

In addition to reporting on current cases of computer crime, the bulletin will look at problems of auditing and accounting, personnel and legislation. There will also be a page for readers' letters and a "problem corner".

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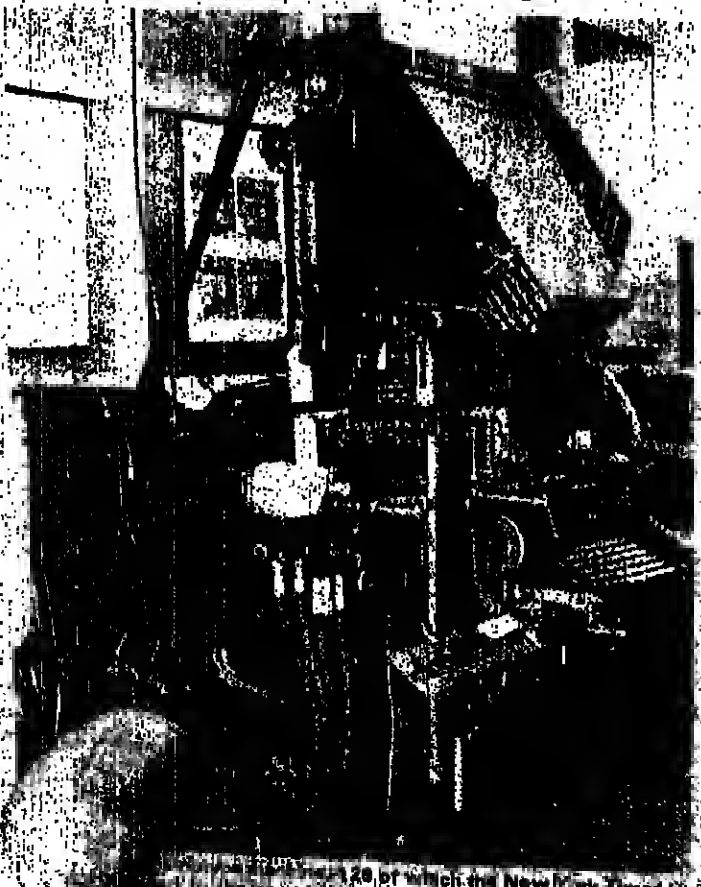
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A large industrial machine, likely a photocomposer or typesetter, used in newspaper production.

Qume venture which became an empire

FOLLOWING generous exposure on BBC-TV's Risk Business programme this summer, the Qume success story is one of the best known in the computer industry.

Viewers learned how David Lee, designer of the Diablo daisy-wheel printer, saw his vital role go unrecognised when Xerox acquired Diablo; how he left to become the kingpin in a new company supported by venture capital investors, and was persuaded, rather against his inclinations, that the brand new product he should design was — a daisy-wheel printer.

The new company duly went into the daisy-wheel printer business, and the burgeoning word processing market took it from a tiny company in 1975 to a \$54 million empire in the last

financial year, which closed in April. The company expects to more than double turnover this year, and with forecasts that the word-processing market will continue to grow at an annual 30-40 per cent per annum, and shared logic systems growing at nearer 60 per cent, any slowdown in its main source of revenue looks a long way off.

Qume's success, of course, grew out of the fact that the only other source of daisy-wheel printers has been Diablo — and that company's parent is Xerox, itself a major competitor in the word processing business. Companies entering the business were disinclined to make a competitor a major supplier, and so Qume's reference list, including such names as Burroughs Reductron, AES-Wardplex, Wydec,

Lexitron, Phillips-Mycom, not to mention IBM — reads like a Who's Who of the business.

The most significant names outside the Qume camp are Xerox itself, and Wang, which uses the Diablo printer, and has now developed its own Xerographic printer for use with word processors (CW, August 24).

To meet demand for its printers, Qume doubled both the rates of production and the number of people employed over the past year, and plans to double sales again this year, although the rate of expansion of the workforce will begin to slow down. The company employs between 1,500 and 2,000 people and has formed Qume Caribe Inc. in Puerto Rico to manufacture printwheels and

ribbons to supplement output from headquarters in Hayward, California.

Demand for Qume's products is still so great that deliveries are typically made 90 to 120 days after receipt of order, though additional capacity is bringing this closer to 60-90 days. The new Sprint 5 daisy-wheel printing terminal is being built for stock and will be available on 30 days' delivery.

Qume is well aware of the potential risks involved in being a one product company and is investing over five per cent of its sales revenue in research and development.

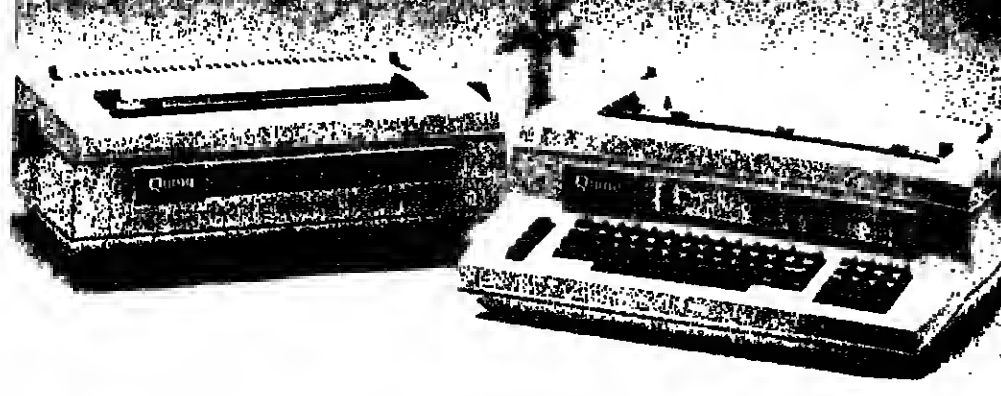
Significant advances have been made in product design, notably the adoption of microelectronics, which makes maintenance much simpler. Boards can now be replaced without need for adjustment, where previously potentiometer circuits needed to be tuned in order to balance the servos each time a circuit board was exchanged.

Microelectronics allows more control of ribbon advance and hammer intensity and reduces the cost and complexity of the products.

Paper handling has been improved, new types of ribbon have been developed, and the variety of printwheels developed has grown steadily.

But Qume sees comparatively little further scope for major reductions in the cost of the product, and although it is constantly on the watch for new technologies which might offer comparable print quality to the daisy-wheel at a lower cost, there is nothing in sight. The

Tim Palmer visits the blossoming world of the daisy-wheel printer



company acknowledges that it would face problems if anybody could refine matrix printer technology to produce daisy-wheel quality, but again, there are no signs that this will happen.

The Sprint 5 printer terminal does mark a mild departure for Qume, and further extensions of the technology are planned. The company is also likely to move into more loosely related electromechanical areas; it does not, however, plan to enter the word processor business on its own account, believing that it would be unwise to go into competition with its major customers.

The similarity of the Qume name to two Exxon office equipment companies Qyx and Qwip, and the fact that Exxon has a stake in Qume, has led people to suppose that the company is part of Exxon's global strategy. In fact, however, Exxon's stake in Qume is less than 10 per cent and the oil giant has no say in the running of the company.

One of the questions often asked about Qume is where it got its name. Apparently the founders commissioned a list of meaningless monosyllabic words, and Qume was the one selected.

Facit saga of Sweden

THE Swedish data processing industry is synonymous in most people's minds with Dataasaab, but there is a second Swedish company operating throughout Europe and much of the rest of the world, selling a competitive portfolio of peripheral products, mainly to the OEM system builder.

That company is Facit, now part of the giant Electrolux company. Facit has been in data products since 1958; the systems side of its business was transferred to Dataasaab following the acquisition of Adco, a paper tape equipment specialist, in 1973.

The data products division of Facit represents about 50 per cent of the company's business, and is supported by a factory employing some 700 people at Atvidaberg, 150 miles east of Stockholm. Facit's own products comprise a range of paper tape peripherals which still bring in big business, particularly in numerical control, and an expanding line of printers.

Seeking to expand its product offering, Facit achieved something of a coup in October 1975 when it acquired the exclusive European distributorship for everything produced by daisy-wheel printer specialist Qume Corp, the company which has grown big on the back of the word processing boom.

Facit believes that it offers US companies an attractive European partner, because it has subsidiaries in all the major European countries. As Alan James, who heads the data pro-

ducts division in the UK says, "Americans see Europe as a single market."

Facit also markets a 180 chip matrix printer from Datarol, and has taken a 36 per cent stake in the company with an option to expand it to 50 per cent.

Preparing for the day when paper tape finally dies, Facit is now moving into the cassette and cartridge tape market, and has discovered another new US company which is in the same infant stage now that Qume was in three years ago.

The company is DEI of Pasadena, founded by ex-Bell and Howell employees with the aim of producing a tape cartridge which would improve the performance of the 3M cartridge.

DEI has achieved its aim, and now has a cartridge capable of carrying 11.5 Megabytes of data — fully adequate for doing a dump from a 10 Megabyte fixed disc. The cartridge is used for this purpose in the new Basic 4 System 400 business computer, and has also been adopted by NCR, while a rugged version is being used by Philips in Sweden for military applications.

Facit plans to launch the cartridge unit in the UK at the Compec exhibition in November.

In the UK, Facit's business is still dominated by paper tape products, which represent over 50 per cent of the annual turnover of over £4 million, but the Qume products represent a growing proportion of the total.

DISTRIBUTED PROCESSING

Why full potential could be delayed by standards

By Pat Blunden

IN their enthusiasm to take advantage of the new techniques offered by distributed processing, how many computer users have actually paused to consider what precisely the term means?

For there is a real danger that in their eagerness to embrace the new concept, some users do not stop to consider whether what they are doing is really a new form of computing.

Consider the following examples. A distributor uses terminals, in his warehouses around the country, linked into a central computer to keep track of order levels and stock holdings. Is that distributed processing?

A manufacturer with regional offices in different parts of the country has a small business computer at each to handle its own invoicing. Aggregated summaries are then sent to head office for accounting purposes. Is that distributed processing?

Both examples use computers or terminal equipment in different geographical locations and both have seen the wisdom of not centralising their processing far away from the place where the work is actually carried out.

But I suggest that neither is a real distributed processing system. If we accept the criteria which I will describe, for I believe that geographical spread by itself, or the use of computing equipment in different locations, does not create a true distributed processing system.

Both of the systems I have described are typical of the kind of business computing arrangements which have been in existence for years.

So why now label them distributed processing? If the term is to be meaningful, it should refer to a form of computing which is new and offers previously unrealised possibilities.

What I am saying is that if we are to make progress in developing distributed processing systems we have to have a commonly acceptable definition of what they are.

So where do we start? Any data processing activity has to take place somewhere, and there are many technical, economic, organisational and management arguments which can lead to a choice of the most appropriate physical locations and class of computing system to support a particular function.

The allocation of functions to systems and locations has always gone on in data processing. It would be useful if a term such as distributed processing could be agreed to describe new and recognisable techniques and capabilities within data processing.

I suggest that these capabilities are concerned with the

connection and co-operation of independent data processing functions within a combined activity.

'A small computer system might have the capacity to run programs but not store large files. If it could access files on a larger system automatically, that would be distributed processing.'

To take this definition further, there are, I believe, two main requirements for a true distributed processing system. First, processing should take place on more than one computer system. Secondly, the systems should work together automatically, rather than in a way which does not involve computer techniques.

This might involve any of a number of different activities in practice. For instance, one computer might automatically supply data to another. One computer might automatically carry out a task on behalf of another.

A small computer system might have the capacity to run programs but not store large files. If it could access files on a larger system automatically, that would be distributed processing.

A more complex example would be one computer running a sub-routine of its own on a different computer automatically.

It is a mistake to believe that distributed processing networks always involve the use of a large host computer with small computers attached to it. It can use computers of approximately equal size, for one of the potential benefits of a distributed processing system is that the separate systems within it can specialise.

For instance, one might handle multi-user interactive work, while another would be used for large database access. In another example, one might handle fast mathematical programs, like those common in linear programming, whereas the other might be used for the human interface into the system.

What is clear is that this method of computing could be more efficient than the past practice of having a huge computer with a giant monolithic operating system which pre-empted much of the computer's resources.

But there are, in fact, a number of pressures which lead users to opt for separate, independent computing systems. It follows that advantages will

eventually flow from linking the systems in distributed networks.

Some of the factors influencing the switch to independent systems include:

● The spread of operational applications supporting the direct activities of many groups in companies and organisations, which leads to managerial demands for local control of functions and resources, and technical demands for customised and separate functions.

● The complexity, performance efficiency and limitations of multi-purpose, multi-function computer systems and their operating software. This leads to technical and economic demands to limit the scope and functions of any one computer system.

● Data, locations and data transmission costs lead to demands for separate geographical locations of systems and functions which reinforce the managerial control and technical complexity arguments.

If these trends do lead to computing functions taking place in a number and variety of systems, possibly in different locations, there could well then be a demand for automatic system inter-working because the different system functions may be inter-related, as stages in an overall process or in a service co-ordinating role.

If the co-operation and inter-working of these distributed functions is an automatic process then the combined activity represents distributed processing.

If the separate systems and programs interface via manually supervised scheduling, co-ordination, control of data transport, then a number of functions may have been separately automated but data processing techniques are not supporting the overall activity, and thus I do not believe that system could accurately be termed distributed processing.

In a sense, the situation is analogous to other quantum leaps in computer capabilities in past years. The introduction of job control languages in the early 1960s opened new possibilities for scheduling computer work. Similarly, the advent of remote job entry with data transmission represented another leap.

If distributed processing is to mean anything at all, too, should represent a major leap in technical capabilities. And it does, in fact, require significant new technical abilities.

Among the capabilities needed to support such a system are system/software support for data communications, communication sessions, system inter-communication and program-program inter-

communication. The system will need to provide for data commands and control according to agreed protocol and procedures.

In the present state of the art, considerable progress still has to be made in establishing the protocols and their support which will be needed for advanced distributed processing systems. At a low level — for data communications — there are many available which are more or less suitable.

But at a higher level, for such tasks as process-process interaction, there are not many protocols defined and even fewer implemented, although IBM and Digital Equipment, in particular, have made some progress in this area.

If the true potential of distributed processing is to be realised, then users must have a choice of individual computers from any supplier for the component functions of a system, and these computers should all be able to communicate, which requires a consensus on standard protocols.

Definition of these for open system connection is still at a very early stage. At the moment the ISO (in conjunction with Anal, the BSI and others) are working on a model for levels of protocols and their roles, and individual protocol proposals.

This work extends as low as communication link control and as high as data coding. But further progress on international agreement of standard definitions in any of these protocol levels probably will not be visible for at least two years. An extensive standardisation and implementation are still further off.

'If the true potential of distributed processing is to be realised, then users must have a choice of individual computers from any supplier for the component functions of a system and these computers should all be able to communicate, which requires a consensus on standard protocols.'

In the meantime, there will be extensive development of "de facto" standards and manufacturers' standards and implementations. But this may restrict much distributed processing to closed systems of a single manufacturer.

The important question is whether this will delay users' ability to grasp the full potential of distributed processing.

THE bad old batch days are gone. In one form or another, distributed processing systems are the current rage.

But one of the problems with the term "distributed processing" is that vendors of computer systems can use it to mean all things to all users.

In this first article in this supplement, Pat Blunden, principal consultant with Seicon Computer Services, tries to dispel some of the myths surrounding the subject and looks at different systems that could be described as distributed processing.

Other articles in this supplement include one by Dennis Papworth, sales manager for Gamma Associates, describing what users should want from a distributed system, and one by David Matthews, on involving the user.

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CW 11

Ask the users at an early stage

THE concept of distributed data processing can hardly be called new; for a number of years now it has been evolving throughout the computer industry.

But what perhaps is new is the extent to which distributed data processing can now be developed beyond the realm of mere concept into the sphere of practical working systems.

Distributed data processing means different things to different people. Much has been written about it in recent years

and there has been much debate about the trend to this type of computing.

With a world-wide announcement last year, Honeywell took its distributed processing ideas a long way beyond pure concept, introducing a wide range of new equipment to give what it has called its DSE, (distributed systems environment) philosophy the means of expression in practical system terms.

More recently, the Honeywell Level 80/DPS, distributed pro-

cessing system, range of computers was announced which encapsulates, at the central site, the further idea of distributing the processing power needed within the mainframe.

But never mind the supplier for the moment (although there's a big question to address in that direction later) let us look at distributed processing from the user's standpoint. Because any technique that doesn't start there will almost certainly start off on the wrong foot.

The technical limitations that previously forced users to place all their computer resources at a central site — and to adjust their business operations to meet the restrictions imposed by such centralisation — have for some time been giving way to a more flexible approach.

This is: allowing the user to distribute the power of the computer in ways that best suit the needs of his business with as much, or as little centralisation as required.

What the user wants, and is now increasingly able to get, is the facility to locate processing power close to where the work is actually done while at the same time maintaining processing disciplines and central control.

Placing the computational activity closer to the actual work site gives faster response time and lower communications costs, and reliability is improved since a single malfunction does not bring down an entire system.

These days this is all well understood by users, and computer companies are well advised to listen to what they have to say about the systems they want.

Many firms have invested heavily over the years in centralisation — centralisation of computer hardware, operations, programming staff, and system software and applications development.

Now, while many users are saying that they want to distribute certain facets of their data processing away from the central site, they are also saying that they need increased capability at their central sites to meet the demand for growth and to maintain control.

For example, some want to distribute limited processing

Honeywell's DST 6/600 distributed system terminal (above) is a mini-computer based system providing local processing, forms made on entry, single pass forms creation, table look-up, data validation and editing, user programmable data entry validation and file transmission to and from a host computer system. Up to four video terminals can be used with each system.

distribution of hardware and software to an end-user organisation in the way that best serves the objectives of that organisation.

What this adds up to is that there are clear trends and needs in the marketplace — trends and needs not totally favouring either centralisation or decentralisation across the market, spectrum but embracing an element of both in differing proportions.

That is to say, what users want above all is flexibility. They want the benefits of centralisation — large system price/performance, sophisticated operating system, improved security as well as multi-dimensional capabilities like transaction processing, time sharing and remote batch.

They also want the benefits of decentralisation such as dedicated processing power, the application programs, and computer operations staff, through the use of intelligent terminals, small business systems and minicomputers.

A good case in point is the computing network which Allied Bakeries is implementing to give its 50 bakeries throughout the UK a greatly improved service and more decentralised control over their own operations.

The network will be based on a tandem Level 88 large-scale system and 44 Level 8 minis. It will provide flexibility in the hands of local management while retaining centrally the capacity necessary for the bulk processing associated with day-to-day production, sales and distribution of bread and bakery products across the country.

It was predominantly the time-critical nature of the baking industry that led Allied Bakeries towards this kind of distributed system which will be able to match production not accurately and more quickly to sales requirements, and give local bakeries the means for determining — and giving effect to — their own order of priorities.

In the past, state of the art limitations and varying standards and interface protocols made the implementation of many such systems as this quite unrealistic.

There is undoubtedly, now, a continuing need for improved processor cost/performance, for improved communications, for a set of common protocols to ensure better standardisation and compatibility, for a more powerful set of terminals to allow the user more convenient system interface, and for enhanced technology to set the stage for future architectures.

Not only do these needs demand the right equipment but they also call for an overall approach to distributed processing.

At other times it calls for the

distribution of hardware and software to an end-user organisation in the way that best serves the objectives of that organisation.

Chance to show 'Beast' is friendly

By Dennis Papworth

DISTRIBUTED processing is computing of, for and by the people. It contains all the advantages of dispersing the mystique of computers but all the dangers of putting highly specialised equipment among non-specialist staff.

The mystique grew up in the sixties and early seventies when an enormous metallic beast was heaved by crane through one of the head office windows on to a floor that nobody afterwards ever went near, partly because they had no business there and partly because it was inhabited by a herd of people who spoke a Different Language. The beast was unapproachable, made life more difficult and was therefore resented.

Resented particularly by non-computer management throughout the company, whose departments were being disciplined from outside by the computer.

Now distributed processing gives the computer manager the opportunity to demonstrate that the beast is friendly: each department can hold a paw — or, to be more precise, a remote job entry terminal — without getting bitten.

All of which is good public relations as long as it works properly — as long as the non-skilled user can handle his terminal without difficulty and obtain his results effectively.

Not only must the system be easy to use, it must be seen to be easy to use. So, the format and sequence of commands to be used should be natural, easy to learn and easy to remember.

The number of commands is also important. Too many of them produce the reaction: "I can't understand it," which is a disguise for: "I can't be bothered to understand it."

This is a crucial point to be made in the promoting of a distributed processing system but it is a factor which distribution itself can make more complex.

The variety of different types of equipment involved will each have to be dealt with in different ways but it is vital that the user is not aware of this, that the software hides it from him and presents him with a homogeneous command format.

The user needs to be assured that the system he is using is reliable. This harks back to the topic of measurement. The user must be given a good impressive figure for mean time between

The key is an evolving one

From page 18

sing that gives the user considerably more flexibility in meeting his own requirements. They also call for a true distributed systems capability embracing common database, common protocol, expanded transaction processing and full compatibility among system components.

These then are the kinds of needs that have to be met by computer companies if they are going to make distributed data processing mean anything more than a grand concept.

Honeywell sees the key to the problem as "evolution" — it believes that if a computer supplier is to move with its customers into the kind of distributed systems environment that will answer their future

failures. An ubiquitous carp at the reliability of a distributed system is that the multiplicity of equipment must make it more prone to failure than a simple control computer.

But once again the multiplicity can be used to advantage — failures can be accommodated by re-routing jobs past the critical point — so the advantage should be pointed out.

There is no reason why an intelligent terminal should be any less reliable than a non-intelligent variety. Its intelligence is based on semiconductor chips which have a proven record of reliability as computer components.

The service the user needs must be readily available. It's not going to get clogged up and his staff aren't going to be sitting for hours in front of a VDU waiting for answers.

Availability will obviously be improved by an addition to the number of host processors but for simplicity's sake the user should, if possible, be switched between the hosts automatically.

The service must be expandable to fit user needs and able to be expanded easily without disrupting the user's usage of it. Remember that ease of upgrading is measurable from the user point of view; it can be set out in terms of the number and type of new procedures the user has to learn to perform a new function. If hardware can be added in a modular fashion, that should please him too.

This modularity is much more achievable in a distributed computing system than it is in a centralised one, always given that the interfaces and protocols used between different pieces of equipment are standardised.

A centralised computer system tends to be monolithic, if only because it all comes from the same manufacturer or from plug compatible alternatives (which is pretty much the same thing). The variety of equipment in a distributed processing system must make it modular in design.

The user must see that the equipment he uses can be maintained with minimum disruption to his routine. Automatic self-diagnostic hardware and software and the use of remote diagnostics through a network are the best way to ensure that problems are

requirements, then the course to take becomes very clear. It means evolving with the user. It means playing a responsive role where users say where they want to go and the supplier then helps them to get there.

Evolving with the user, however, puts a computer supplier right in the middle of the problem and there's no better place to be if the most practical answers are to be found.

The big question remains, though: Given that good theoretical answers can be found, does every supplier have the necessary equipment to turn those answers into effective working systems?

It is a good question — and one that users would do well to ask at an early stage.

isolated and identified quickly.

The big problem here is that the processing power in your system is going to be widely dispersed, speaking in pure geographical terms, there's no way around this except for a rigid maintenance schedule.

The user will be worried that the information he processes via the system will remain confidential. Apart from the question of company security, there is also the problem of each department maintaining the degree of autonomy to which it is used.

Once again, geographical dispersion exacerbates the problem. The user may not even know where his data is being stored, so he is going to take a lot of reassuring.

There are various techniques available for personal identification to limit access to authorised users — having intelligence present in the terminal means that these procedures can be made quite difficult to simulate or circumvent.

Encryption of data while it is being sent through the network should be a flawless security device. But because the user has sophisticated equipment to hand in his own department, he should be able to store locally

and thus obviate the need to transmit large volumes of data at frequent intervals.

Finally, the design of the system must be oriented towards non-technical users. At the conference on future systems last year, an independent consultant laid down four basic design rules for anyone thinking about installing a distributed processing system in their organisation: the rules stressed that distributed processing is for ordinary people.

According to him, local processing power must not mean local specialist data processing staff and all technical implementation must be performed or controlled by the central computer department.

Also, data capture must be as near to the origin of data as possible and specialist data processing staff should not intervene in the internal distribution of data.

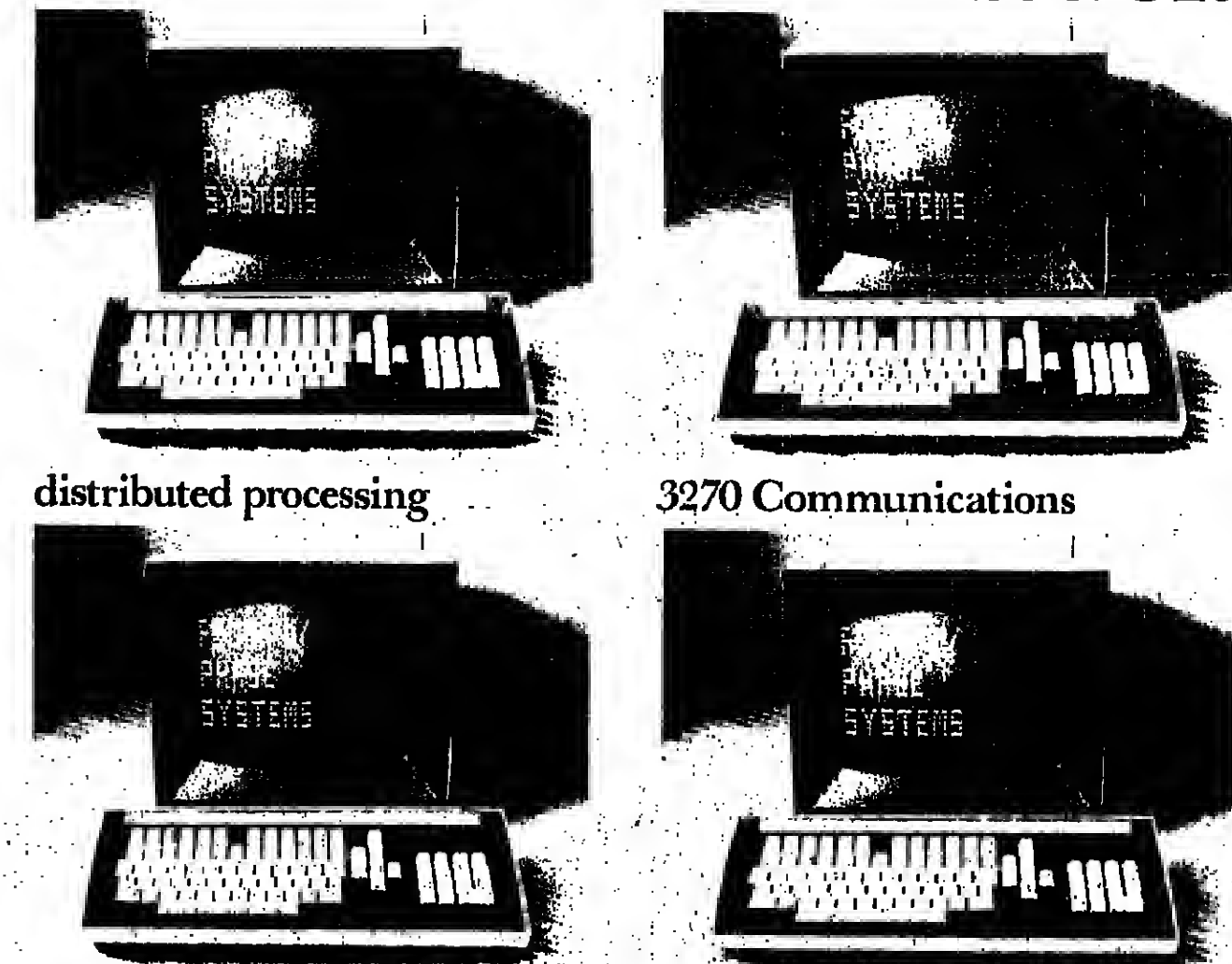


Distributed processing is one way that the traditional animosity between user and DP manager can be broken down.

Yes, the user can even shake pawa (remote job entry terminal) with the beast without getting bitten.

Dennis Papworth, sales manager for Gemma Associates, describes what users should want from a distributed system. He concludes by urging that designers should orientate the systems towards non-technical users.

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Tuesday, October 17, 1978, at the Holiday Inn, London

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This practical workshop, to be run by Nigel Laurie of Communications Audit, will help delegates to discover the techniques and approaches that work best in helping successful user relations. The workshop is practical and based on experience. Above all it is participative so that delegates can put theory into practice. A summary of a survey

conducted at a previous Nigel Laurie workshop on this subject was published in Computer Weekly on May 25.

For this latest workshop the number of participants will be limited in order that the maximum benefit may be achieved. If you would like to reserve a place please complete the application form and return it to the address shown, not to Computer Weekly or the IDPM. A brochure giving further information about the workshop may be had from Tony Swain, BIT, 40 Bowling Green Lane, London EC1A 3BS.

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Please reserve a place for the Successful User Relations Workshop to be held at the Holiday Inn, George Street, London on Tuesday, October 17, 1978. The fee is £60 (plus VAT £4) for members of the IDPM, £84 (plus VAT £3.60) for non-members. This covers attendance at the workshop, coffee, lunch and tea and full course documentation.

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DP 17 1978

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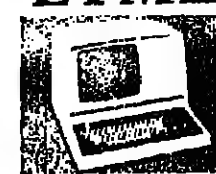
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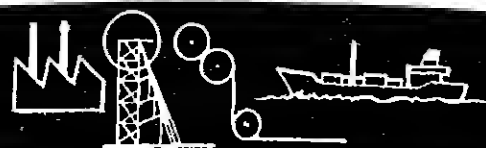
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NORTHERN APPOINTMENTS



Pilgrim's progress up the Motorway

By Peregrine Butler

If you ask a Southerner where Manchester is, you're likely to get this reply: "Manchester? Yes, well, it's a jolly long way up the M1." And there the conversation will terminate.

This applies to the North in general. Everyone has a vague notion of its whereabouts but no one is sufficiently well-informed to give you more accurate directions.

Southerners have not heard of Wales because they have friends who own weekend retreats there, but the North is in some dismal abyss beyond — never to be visited, unlike like something out of Pilgrim's Progress.

I myself suffered from this misconception until I moved to the North. Naturally London friends were

horrified when I broke the news. To them the North was synonymous with Siberia. They were even more horrified when I reported that the North actually was a nice place — not everyone wore eluth coats, and they really did eat off tables with knives and forks. Some Northerners do wear cloth caps, but then Harrods sells the very same article for the winter fashions.

It's a pity that Southerners are so sceptical. In my experience, the North has more to offer than the South, something you will be made well aware of as you read this article.

To start with, there are the people — warm and friendly with always five minutes to spare. Not because they have nothing

better to do, but you might say it's just a natural courtesy to chat and find out a little more about one's fellow man (a habit which, I have noticed, the people in the South certainly do not possess).

The North is liberally sprinkled with excellent shopping centres in beautiful historic towns and cities such as Chester, Harrogate and York. Of course, getting to any of these places is no problem whatsoever, as the North has the best motorway network in the United Kingdom, linking every city, airport and major town.

As far as the social side of life in the North is concerned, it is conveniently situated for all types of activities. If you're a fresh-air type

there are excellent outdoor pursuits. The North has superb walks in Derbyshire, the Yorkshire Dales and the Pennines. The Ribbles, Dees, and Test are teeming with fish but not overcrowded with enthusiastic anglers.

For the theatre-goer, Manchester boasts several theatres with a very varied selection of entertainment, and of course the world-famous Halle Orchestra is based in Manchester.

The Northerners take their social life very seriously, so we find scattered throughout the North some of the best night-clubs in the United Kingdom.

For the gourmet too, there are superb restaurants, admittedly not as concentrated as in the South, but certainly worth the journey. (Two recent

winners of the Egon Ronay Best Restaurant of the Year Award survive in Kelghley and Ilkley in Yorkshire.) For those who enjoy a well-brewed pint, there are many delightful and picturesque pubs to be visited, with real ale at only 27p per pint.

The North is certainly not for the faint hearted! For the businessman, Manchester, as the commercial centre for the North, has every facility to be wished for, including fast train links with London (approximately 2 1/2 hours), and regular flights connecting with every other major city in the United Kingdom, and with Europe.

For the computer professional in the North, there is everything and more. It is possible to divide the ad-

The North to a Southerner is in some dismal abyss beyond — never to be visited, rather like something out of Pilgrim's Progress. I, myself, suffered from this misconception, writes Peregrine Butler, manager (North) of Knight Programming Support, based in Manchester. They were even more horrified when he reported that the North actually was a nice place. Some Northerners do wear cloth caps, but then Harrods sells them as high fashion in the South.

vantages of living and working in the North into three categories: — domestic, social (which we have already covered), and career opportunities.

First of all, I'll take the domestic side for either a single or a married person. The main thing that springs to mind is property. It is possible to buy a terrace house in a beautiful village for as little as £3,000. Or the budding DP manager can buy a detached house in its own grounds for around £23,000. There are no problems or waiting lists for people who want to buy property in the North. (Just think, your house in the South could buy you something of around twice the size in the North!)

As a lot of these installations are new they carry most up-to-date and sophisticated hardware and software, therefore it must be obvious that career potential is enormous.

In recruiting for Northern clients, we find that most companies offer very generous relocation ex-

penses from the South. Salaries tend to be very competitive; in some cases more than you would expect to earn in the South of England.

All the larger companies, and the majority of smaller companies, rely on service organisations such as our own for both contract and permanent staff requirements. We are very much used as a consultancy, and that there is a more varied selection of work. This really means that the computer professional can select the job that suits him best, rather than accept the job that he may have to take in the South.

Still, anybody who reads the computer press regularly will know that there are a vast number of openings in the North of England, and that the range of career opportunities is too numerous to mention in this article. Let me just remind you that the more relaxed pace of life in the North lends itself to a more satisfying working environment.

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Our Client, a market leader in the Leisure Industry, is shortly to upgrade its mainframe to an ICL 1904S and introduce a free-standing Burroughs 1825.

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The Company offers excellent prospects for personal progression and is situated in a brand new purpose built office block. Assistance will be given with relocation where necessary. CW 2878

LIVERPOOL

4/5 OPERATORS

Basic Salary £3000 + 33 1/3% Shift Premium

Due to continued expansion and resulting promotions, this client now seeks Operators with approximately 2 years' experience on large systems with a minimum educational background to 'O' level standard.

The Company is working a 4-shift system and planned future expansion of the installation offers excellent prospects of promotion together with normal benefits offered by a large company. Rel. CW 4978

LIVERPOOL & MANCHESTER

PROGRAMMERS Salary up to £5350 + Benefits SENIOR PROGRAMMERS ANALYST PROGRAMMERS

Salary up to £6000 + Benefits

Our client has vacancies based in Manchester and Liverpool for experienced computer staff at all levels. Opportunities exist on development work with both minis and mainframes. Specific expertise is less important than a high degree of competence and conscientiousness, as the Client has a committed policy of ongoing staff training.

The company offers excellent opportunities for career development based on personal performance, and there are occasional opportunities for travel. Rel. CW 6978

For an application form in respect of these and hundreds of other vacancies please contact Miss Val Halliwell
VICTORIA APPOINTMENTS LIMITED, 24 MOSLEY STREET, MANCHESTER 2
061-236 7319 (24-hr. Answering Services) and 061-236 7417

SENIOR ANALYSTS & PROGRAMMERS £5,000 - £5,500 MERSEYSIDE REF: LL 78111

A systems or programming background of three to four years or more could gain you senior status in our client's IBM 370 installation. COBOL is the main language and there is a mixture of batch and on-line database work. Plans are in hand for distributed processing. A flexitime scheme is operated. Holidays are 4+ weeks. Relocation assistance is available.

ANALYSTS & PROGRAMMERS FROM £4,000 NORTH WEST REF: LL 78103

There is a chance to get away from the cities and work in rural Lakeland with our client who is engaged in advanced engineering. The requirement is for commercial and scientific analysts and programmers. The hardware is IBM 370 under DOS/VS. Languages include COBOL, Assembler, FORTRAN, ALGOL. Flexitime is in operation. Relocation expenses where necessary.

OPERATORS TO £3,250+ SHIFT ALLOWANCE LIVERPOOL REF: LL 78102

Our client operates a computer department which in itself is larger than many medium-sized companies. The current vacancy for experienced operators therefore offers real challenge and opportunity. If you would like to work in a large installation, have operated mainframes for two or more years and would be prepared to relocate if necessary, this could be your big chance.

OPPORTUNITIES WITHIN KBS TO £6,500 LIVERPOOL, LONDON, LEEDS, COVENTRY & CARDIFF REF: KBV 7801

KBS is looking for staff with both variety and depth of experience to take up challenging and rewarding appointments:

TRAINING DIVISION — Systems Analysts with an ability to communicate to work as LECTURERS. (Training will be given).

SOFTWARE DIVISION — Programmers with 3 or more years experience, 2 or more languages and experience of more than one mainframe.

RECRUITMENT DIVISION — Programmers or Analysts to work as Consultants in major cities.

BUREAU DIVISION — All staff types with experience of the bureau environment.

KBS is a rapidly expanding computer services company. All vacancies carry generous terms and the benefits of a large company operation.

PROGRAMMERS — ALL LEVELS TO £5,300 LANCASHIRE REF: LL 78110

Our client has vacancies for junior programmers, programmers and senior programmers to work on IBM and other mainframes. The languages are Assembler, COBOL, PL/I, R.P.G.A. A minimum of 18 months experience is required. The size of installation is large in terms of both equipment and staff. Most work is batch but distributed processing is just around the corner. Staff terms, holidays and special benefits are excellent.

ASSEMBLER PROGRAMMERS £3,500 — £4,750 LIVERPOOL REF: LL 78105

Assembler programmers can look to a considerable widening of their horizons if they join our client's twin IBM 370 installation. A minimum of two years experience will qualify you to work in an expanding team. The computer department serves a very large Group organisation which yields a constant variety of assignment. General terms and conditions of employment are very good.

COBOL PROGRAMMERS £4,000 — £5,000 LIVERPOOL REF: LL 78104

COBOL programmers are required by our client, a food manufacturing company, to work in a Honeywell level 88 T.P. installation. With a development schedule extending well into the future, these permanent appointments offer both security and good promotional opportunities. Our client will assist with relocation.

SENIOR PROGRAMMERS £4,000 — £5,000 LIVERPOOL REF: LL 78107

Programmers with a minimum of three years COBOL and BAL experience should see these vacancies as an opportunity to take their claim to real seniority. Our client operates an IBM 370 under DOS and has scheduled some imaginative assignments. Assistance will be given with relocation where necessary.

KBS Computer Services

State Insurance Buildings, 14 Dale Street, Liverpool, L2 4TH. Telephone: 061-236 7711.

061 236 7711

NORTHERN FEATURE

**PERMANENT APPOINTMENTS
NORTH WEST ENGLAND
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New contracting division offers excellent prospects to freelance analysts and programmers. Even if you are not currently available we would like to talk to you NOW!

Contact Katrina Staniers

Ivor Norton Management Services Ltd
Recruitment Consulting Division

SUNDERLAND POLYTECHNIC Faculty of Engineering RESEARCH OFFICER

This post is to assist in research projects using simulation techniques to study production systems. The successful applicant should be suitably qualified in computer science, mathematics, or engineering with an interest in computer programming. The appointment is initially for two years.

The salary scale for Research Officers is £3,182-£138 x 2 - £3,485 per annum.

An application form may be obtained from the Personnel Officer, Sunderland Polytechnic, Chester Road, Sunderland, SR1 3SD, and should be submitted as soon as possible.

UNIVERSITY OF NEWCASTLE UPON TYNE Computing Laboratory RESEARCH IN COMPUTER ARCHITECTURE AND OPERATING SYSTEMS

Applications are invited for Research Associate posts in a project concerning the reliability and integrity of distributed computing systems. This Science Research Council sponsored project is a successor to earlier work on the design of highly reliable computing systems, and will involve both theoretical studies and the implementation of prototype systems. Candidates should possess a Ph.D. degree, or equivalent experience, in one or more of the following areas: Operating Systems, Computers, Parallel and Distributed Systems. Applicants must be up to four years and will be at a point on the University's salary scale £3853-£5555. Applications should be sent to the Computing Laboratory, Newcastle upon Tyne NE1 7RU, and later than 30th October, 1978.

PRESTON POLYTECHNIC.

Computing Services
Unit

Programmer/ Analyst

required with experience in Cobol and Fortran. The successful applicant will be responsible for the design, development, testing and maintenance of computer programs for either Application Administration or Technical or Software programming. A degree or relevant qualification and a knowledge of ICL computer and software is desirable.

Salary Scale AP/2/3/4/5 £2067-£4320 plus £312 per annum supplement.

32H hours, 5-day week. For superannuation.

Application forms and further details from Staffing Officer, Preston Polytechnic, Corporation Street, Preston.

Closing date: 7th October, 1978.
Ref. No. NY/78/79/12.

THE UNIVERSITY OF MANCHESTER DEPARTMENT OF OPTICO-ELECTRONICS RESEARCH ASSISTANT IN COMPUTER GRAPHICS

Applications are invited for this three-year post. Candidates will be required to assist in the development of computer graphics software and hardware. The successful applicant will be responsible for the design, development, testing and maintenance of computer programs for either Application Administration or Technical or Software programming. A degree or relevant qualification and a knowledge of ICL computer and software is desirable.

Salary Scale AP/2/3/4/5 £2067-£4320 plus £312 per annum supplement.

FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY

Write to: Susan Parrell at
Mark Williams on
01-261 8025
or 01-261 8015

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- * ON-LINE SYSTEMS
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THE INSTALLATION:
Leeds Permanent Building Society has already installed an advanced teleprocessing network at Head Office in Leeds and in more than 200 Branch Offices throughout the United Kingdom. Work is now commencing on new on-line systems and the upgrading of the central site hardware by the addition of an IBM 3031 based configuration.

THE REQUIREMENT:
Professional D.P. personnel in all levels are required to assist in the technical design and programming of management information systems and development of new teleprocessing facilities.

THE BENEFITS:
In addition to competitive salaries the Society offers a full mortgage scheme, pension, life assurance and sickness benefits, subsidised staff restaurant and recreational facilities. There is also the challenge of working with the latest technology.

Write briefly or telephone for an application form to:-

J Clark Personnel Manager
Leeds Permanent Building Society
Personnel House, The Headrow, LEEDS LS1 1NS
Telephone Leeds (0532) 38181 Ext 445

**ONE OF THE
BIG FIVE**

ANALYST PROGRAMMER

CW/178

Phillips Petroleum Company, one of the pioneers in North Sea Oil development, have established a major oil processing and terminal facility at Seal Sands, Cleveland.

A vacancy has arisen within our Computing Centre for an Analyst Programmer who wishes to utilise his/her experience in the further development of application software. Utilising the IBM System 3 computer we have systems covering commercial, technical and data communications fields of operation.

Preference will be given to applicants having a minimum of four years' systems analysis and programming experience and a sound knowledge of Cobol and one or more of the following: Fortran, Telecommunications, on-line systems.

If you are interested in this vacancy, please write for an application form (quoting job reference number) to Mr B. Sutherland, Personnel/Training Officer.

PHILLIPS PETROLEUM COMPANY

Technical Operations, Seal Sands, Middlesbrough, Cleveland TS2 1HD. Tel. 0642 596411

IBM PROGRAMMING EXPERIENCE!

MOVE INTO ANALYSIS WITH ICI

ICI's Pharmaceuticals Division is looking for young men or women with around 2 years' programming experience using IBM 360/370.

Comprising analysts, programmers and a data control function, the section is responsible for systems analysis, design and programming and production of divisional management accounting information. As a programmer/analyst you would be responsible both for development work and the operation and maintenance of current systems, with good scope for career development.

Aged around 22/32 with a graduate level qualification, you will need a good knowledge of PL/I and Cobol. Experience with Burroughs systems and on-line and management accounting systems is desirable.

The Division is situated in a delightful and easily accessible part of the Cheshire countryside. Salary and other benefits are excellent, including relocation expenses, bonus and profit sharing schemes and sports and social clubs.

For information and an application form, ring Kate Hudson on Alderley Edge 582828 or write to her at:

Personnel Department,
ICI Limited,
Pharmaceuticals Division,
Alderley House,
Alderley Park,
Macclesfield,
Cheshire.

ANALYSTS AND PROGRAMMERS £5,000 - £6,500 LEEDS

Top jobs in a new £1,000,000 installation offering extensive career development opportunities. Systems in early stages of development include real-time, on-line and distributed processing.

Further major developments involving additional £multi-million investment in equipment are also at a final stage of consideration.

In addition to a good salary package there are considerable company benefits and relocation expenses will be paid. Write or telephone Ivor Norton, quoting ref. c/78087, to arrange a confidential interview.

FOR LOCAL CANDIDATES:

INFORMAL INTERVIEWS WILL BE HELD ON THE FOLLOWING DAYS AT THE HOTELS LISTED BELOW AND INTERESTED CANDIDATES ARE INVITED TO CALL BETWEEN 4.30 p.m. and 9.00 p.m. FOR A GENERAL DISCUSSION. NO APPOINTMENT IS NECESSARY.

WAKEFIELD

Tuesday 26th September 1978
Swallow Hotel

BRADFORD

Wednesday 27th September 1978
Norfolk Gardens Hotel

LEEDS

Thursday 28th September 1978
Dragonara Hotel

Ivor Norton Management Services Ltd

Recruitment Consulting Division

P.O. Box 63, Cophall Tower House, Harrogate HG1 1TS. Tel: Harrogate 66628.

CHALLENGING POSITIONS!

EXCELLENT LOCATION

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Our Clients are Humberside's largest and most successful computer bureau providing services to both Clients and Group users. They are currently developing a wide range of packages and bespoke systems utilising both ICL mainframes and Digico mini computer hardware.

ANALYST/PROGRAMMERS to £5,500

These positions will involve designing and specifying commercial systems and packages, with involvement in mini computers for data collection and distributed processing. You should ideally have a COBOL background and commercial systems experience.

SENIOR PROGRAMMER to £5,000

You will be involved in designing and developing packages for use both on in-house mainframes and mini computers. (Training will be given.) You should have 2 years' COBOL experience gained in an ICL installation.

SYSTEMS CONSULTANT to £5,500

This is a key appointment within our Clients' special accounting team. You will be involved in developing financial systems for the Group as a whole and working in close liaison with Senior Accountants. Applicants should ideally have:

- * a sound understanding of accounting systems
- * good communicative skills
- * meaningful achievements in the accounting area
- * a good educational background

SYSTEMS CONSULTANT to £5,000 Plus Car

To support our Clients' development of mini computers they require a professional with a good mechanical grounding in mini computer software. Responsibilities will include the design of system software, as well as involvement in product and market specifications and pre and post sales support.

SENIOR PROGRAMMER (Mini) to £5,000

This position will involve specifying and programming primarily in the area of systems software. Ideally you should have experience of Assembler and Basic gained in a mini computer or micro processor based environment.

All the above positions carry excellent terms and conditions of employment including flexible time, pension and a relocation package. North Humberside is one of the more pleasant areas within the United Kingdom offering a blend of coastal and country locations within easy commuting distance. The area also offers reasonably priced housing and good recreational facilities.

CONTACT: David G. Wade on 081-833 0427 or 0788 96013 outside office hours.

Ref: CW/9/78

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MANCHESTER 061-833 0427
Freeport, Blackfriars House, The Pavilions, Manchester M3 2BB.
LONDON 01-935 0371
Freeport 6, 102, Blandford Square,
London W1E 1JZ.

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Services
Association

PROGRAMMERS £4,000 to £6,000 SYSTEMS ANALYSTS



INTERNATIONAL HARVESTER

SOUTH YORKSHIRE — DONCASTER

International Harvester Company of G.B. Limited is part of a world-wide organisation and a major manufacturer and marketer of agricultural, industrial and construction equipment.

Attractive career openings for programmers and systems analysts have recently arisen in their large and advanced Information Systems Services Division at Doncaster, South Yorkshire. This Division is continually expanding its advanced systems and techniques in the areas of Data Bases, Communications, On-Line and Batch Processing through the use of a sophisticated Honeywell Level 66 Computer.

You should have a good educational background and for the analysis positions a sound knowledge and experience of commercial and/or manufacturing systems. Applicants for the programming positions should be experienced in the use of COBOL. In all cases a knowledge of advanced techniques i.e. Database, On-line processing or Communications would be an asset.

Salary will be negotiable according to experience and qualifications. A generous range of benefits include assistance with re-location where appropriate.

To find out more simply ring Len Cray (Reversing Charges) on LEEDS (0532) 444185. Alternatively write with brief career details quoting Ref: CW12, to Lorien Computer Services Limited, FREEPOST, LEEDS LS7 3YY (No stamp required)

PROGRAMMING OPPORTUNITIES to £5,000 COBOL LEEDS

A progressive user of medium sized IBM hardware, based in Leeds has vacancies for additional COBOL programmers at various levels of experience. You will be given every opportunity to extend your range of expertise, using the latest techniques, in an expanding and exciting group environment.

Applications include sales order processing, accounting and production systems utilising CICS, RJE and remote processing.

OUR CLIENT OFFERS YOU:

A very attractive salary package, four weeks holiday, flexi-time working and good company benefits, including relocation where applicable.

A continuous training programme is in operation designed to make the most of your potential. Attractive careers exist with our client for those wishing to remain in programming whilst the route to analysis is open to all.

INTERESTED?

If you have COBOL experience to date then ring IRENE ROGERS on Leeds 444185 to find out more about these very attractive vacancies. Alternatively, write with brief career details quoting Ref: CW14, to Lorien Computer Services Limited, Freeport, Leeds LS7 3YY. (No Stamp is required).

BUSINESS ANALYST POSITIONS — MERSEYSIDE

A major user of advanced DP systems throughout the company has a requirement for additional business analysts at several levels of experience. The company currently operates the latest large computer hardware with satellite mini-computers. Future hardware plans are extensive.

PRINCIPAL BUSINESS ANALYST to £5,750

You will be responsible for a small team of business analysts and interface with technical and line management personnel. You may expect to work on a variety of projects and gain a broad understanding of our client's business.

RESPONSIBILITIES

To help develop viable systems from feasibility through to post implementation review.

REQUIREMENTS

Candidates must have a good academic record and several years systems development experience in a large company environment. An all round appreciation of business situations is also essential.

REF: CW15

In all cases our client offers an attractive benefits package with full relocation if required. Initial interviews will be held in Leeds, Liverpool and London to suit applicants. To find out more simply ring LEN CRAY (reversing the charges) on LEEDS (0532) 444185. Alternatively, write with career details to date quoting REF: CW15, to Lorien Computer Services Limited, FREEPOST, LEEDS LS7 3YY (no stamp required).

These positions will appeal to non-technical DP analysts with a strong interest in business systems in their widest sense. You will be committed to the use of efficient systems, whether computer based or not, you will be concerned more with the impact of systems on the business rather than on technical content.

BUSINESS ANALYST to £5,100

You may work either as a member of a team or alone on a wide range of business systems. You will be engaged on all aspects of analysis from feasibility studies to implementation.

TRAINING

In order to improve your analytical skills our client offers on-going training in technical matters together with management training. Opportunities for career progression are extensive.

REQUIREMENTS

A good academic background should be allied to at least two years' systems development experience. You may have a computer or O & M background.

REF: CW16

LORIEN COMPUTER SERVICES



OCS House,
Servia Road, Leeds LS7 1NJ
Telephone 0532 444185

FERODO

SENIOR SYSTEMS ANALYSTS

THE COMPANY

Ferodo Limited is situated in the Peak District — an attractive rural area with relatively low cost housing within commuting distance of both Sheffield and Manchester. We are one of the country's leading manufacturers of friction components and following several promotions and development of new projects — are currently seeking Senior Systems Analysts to join us at our Head Office.

OUR COMPUTER

Ferodo Limited is part of the Turner and Newall Group and is one of the most computerising a centrally located IBM 370/158 running under OS/VS1 and using IMS. We are shortly upgrading to MVS. Some of our systems are still running on our locally based ICL 1902T but these are rapidly being transferred to the central IBM machine.

THE JOB

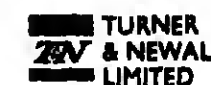
The successful applicants will be involved in new developments concerning Factory Loading, Progress Control, online Order Processing and Group Accounting Systems which will include an online Sales Ledger. Full training will be given where necessary.

THE APPLICANTS

The job calls for 2-3 years' experience and achievement in commercial systems analysis, design, development and implementation. Educational requirements are qualifications at A level standard or equivalent and preferably a degree.

We offer Competitive Salaries according to experience and suitability and the benefits package includes membership of the excellent Turner and Newall pension scheme, free BUPA membership, four weeks holiday, assistance with relocation expenses, etc. We work a 5 day 37-hour week — 8.35 a.m. to 4.30 p.m.

To find out more about this job, telephone our Systems and Programming Manager Brian Smith on 029-881 2520, ext. 320, or alternatively, write for an application form to The Personnel Manager, John Croxall, Ferodo Ltd., Chapel-on-the-Firth, via Stockport SK12 6JP.



SYSTEMS ANALYST

An opportunity now exists to join Cummins Engine Company Limited, one of the World's leading manufacturers of high-speed diesel engines as a Systems Analyst.

Date Processing within Cummins involves the use of large Data bases to support on-line systems and if you are enthusiastic about the prospect of applying progressive techniques in a challenging environment then this position is for you.

The job involves all aspects of systems development from feasibility study through to final implementation and a successful record of several years' Date Processing experience is therefore essential. This is an excellent opportunity for an experienced Programmer seeking a first appointment in Systems Analysis.

Conditions of employment including salary are those expected by a major international company and include flexible working hours, 23 days' vacation, free life assurance and relocation assistance to this attractive part of the North East.

Applications, enclosing a detailed C.V. should be addressed to
Joelle Pottinger
Personnel Supervisor



CUMMINS ENGINE COMPANY LIMITED
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Co. Durham
Telephone Darlington 80808



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We will be at the Grand Hotel, Central, Manchester anytime between 11 am and 8 pm on Monday 25th, Tuesday 26th and Wednesday 27th September.

Don't miss this chance to find out about Europe's leading systems house that really know about industrial computing.

If you can't come — ring 061 236 9559 or 061 442 9552 and ask for SPL. Battersea House, Battersea Road, Heddon-on-the-Wall, Cheshire, SK4 3EA.



Real-Time Programmers

Are you good enough to support Ferranti's real time customers?

The Wythenshawe Division of Ferranti Computer Systems Limited are seeking several additional programmers for their small but highly important Customer Support Section. These positions offer suitable candidates a superb opportunity to develop their existing real-time software expertise to the full, and to make substantial contributions to the further development of Ferranti's sophisticated real-time operating systems and associated software.

The company believes in promotion from within, and technical staff can reach the very highest management levels in the company, which depends upon its technical expertise to remain at the forefront of technology.

The job

The job of the customer support programmer involves the following main activities:

* Operating system building and testing. This is a combination of product development and quality assurance, and real scope exists for original and creative work.

* Software installation on-site, giving opportunities for short visits in the UK and overseas.

* Problem solving. The 'sharp end' of the business, requiring diagnostic flair, and the ability to work under pressure. Ideas for operating system improvement are often generated here.

If you have these attributes, the company will pay you well; and will give you every opportunity to progress. The test is up to you. The offices are located on the South side of Manchester, in pleasant and rural surroundings. Assistance with relocation is available where necessary, and the usual large company benefits apply. Please apply to Sampson Staff in the first instance, either by telephone (transfer charges if necessary), or letter. Initial interviews will be held in Manchester or London.

Sampson Staff 15 Piccadilly, Manchester M1 1LT. Tel: 061-832 4184. Evenings and Weekends — Tottington (020488) 2545.

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Let's face it, the problem for many computer staff these days is not so much finding another job, as choosing the right job from a very wide range of possibilities.

Because of this, we make a point of talking to each candidate about their career ambitions, and we then select — with them — the most appropriate vacancies to put them forward for.

The result? The interviews you go for will be much more likely to be productive. On average, one in every two interviews with a client results in a job offer.

At the present time we are handling a lot of vacancies, mostly in the North, but with a significant number in the Midlands. An indication of the type of vacancies available is given opposite, but a phone call — transfer charges if necessary — to Arnold Sampson will rapidly determine whether or not we can help.

Sampson Staff 15 Piccadilly, Manchester M1 1LT. Tel: 061-832 4184. Evenings and Weekends — Tottington (020488) 2545.

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International Sales Division
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Tel: 01-240 2713

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ANALYST PROGRAMMER

Applications are invited from suitably experienced candidates (graduate or postgraduate) for the post of Analyst/Programmer in the Information Systems Department. The post is based on an ICL 2902 installation and involves the administrative aspects of the University's computer system. The successful candidate will be responsible for the day-to-day running of the system, including the preparation of reports, the maintenance of the system, and the provision of advice to users. The post is a full-time position and involves a commitment to the University for a period of three years. The salary for this post is £8,000 per annum. Applications should be sent to the Director of the Information Systems Department, The University of Aston, 4th Floor, School of Management, Birmingham B4 7ET, quoting reference number 1/81/1/1.

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There is currently in the North of England an unmet demand for computer staff at all levels. We have a number of urgent requirements for experienced people to work on varied and interesting applications in all parts of the North. Excellent salaries are offered and total relocation expenses are often available.

WE HAVE THE JOBS — ALL WE NEED ARE THE PEOPLE

Telephone: Liz Segal on 061-834 2271 during office hours or 061-926 5495 evenings and weekends for a chat about your requirements.

William Key & Partners Ltd, 504/8 Corn Exchange Building, Corporation Street, Manchester M4 3DD

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is an expanding Computer Bureau situated in the heart of the city of Huddersfield. We offer specialised services to the Accountancy profession, Industry and Commerce and as a result of our planned growth, we now have vacancies for the following personnel:

ANALYST/PROGRAMMER £ NEG

Required to assist us in the development and implementation of new and existing systems and packages. The person appointed must be an enthusiastic self-starter, keen to take initiative and responsibility in a stimulating, small team environment.

SENIOR OPERATOR c. £4,000 p.a.

To take control of the day to day running of the operations section, reporting direct to the DPM. Candidates must have the flair and aptitude to develop and consequently grow within this important area.

Please apply, in confidence, giving full details of education and experience to: Roger Freeman, O.P. Manager, Woodsome Park Associates Limited, 4 Rowley Lane, Penny Bridge, Huddersfield HD8 0JG.

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Manchester 2



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COMPUTER SERVICES/ SUPERVISOR

North Manchester. Salary: Negotiable with fringe benefits. Joseph Stocks & Sons are a major importer and distributor of Danish Bacon and other quality products. The company is situated at Woodfield, North Manchester, with easy access to the M27 motorway.

We require an experienced computer supervisor to take control of our DIGITAL TOP 11/40 computer operating 10 terminals, on line both locally and via the GPO network to a depot in Liverpool.

If you have experience of:
1. Digital Computers using TOPS reporting systems software
2. Basic Plus programming
3. Systems analysis and design
4. Working knowledge of data processing and all accounting functions
5. Control of On Line and Batch operations
6. Communications in handling

We can offer:
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Any person below the age of 25 or earning less than £4,000 annum would probably not have the relevant experience. Otherwise apply in confidence giving full details of qualifications and experience to:
The Secretary to the Directors
JOSEPH STOCKS & SONS LTD.
87 Stanley Road, Whitefield,
Manchester M28 8OP

THE COWIE GROUP

have a vacancy for an

ANALYST/ PROGRAMMER

The group will shortly be replacing IBM System 32 with System 34, further enhancement is scheduled during 1979 including additional terminals and real time operation.

We are looking to recruit an analyst/programmer with proven ability to assist in improving current in-house systems together with projected development.

Preference will be given to applicants possessing a sound knowledge of analytical techniques and RPG 11 relevant IBM experience would be helpful.

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NORTH WESTERN REGIONAL HEALTH AUTHORITY

The Authority has an ICL 1904S Computer with 8K magnetic tapes 7X £6500 with data communication terminals at various locations. The following vacancies are based at Gateway House and involve working on developments in Medical Computing

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Reference Number 1633/1
Salary Scale: £4665-£6028 per annum
Location — Initially Hope Hospital, Salford; later Gateway House
At least two years' experience of systems analysis and implementation of computer based projects, or be senior programmers willing to be trained as analysts. ICL 1800 or 2800 series systems experience an advantage.

PROGRAMMER

Reference Number 1633/2
Salary Scale: £4421-£5328 per annum
Location — Gateway House
Minimum of 2 years' programming experience required; knowledge of George III and/or FILETAB an advantage. Applicants with at least 1 year's programming experience or an R.N.D. in computer studies or equivalent will be considered for appointment as a Junior Programmer salary scale £3452-£4241 per annum.

Application forms and job description from Regional Administrator, North Western Regional Health Authority, Gateway House, Piccadilly South, Manchester, M60 7LP, quoting the appropriate reference number. Closing date 4th October, 1978.

Health Care— Sheffield

Our Health Care team provides systems to help improve patient care and enable Doctors and Administrators to make better use of resources. The work ranges from immunisation and family practitioner systems to medical systems for individual Consultants. We need two additional experienced staff for this team. Applicants for the Programmer pool should be experienced in COBOL.

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£4,421-£5,328 ref. JAA 102

Programmer

£4,421-£5,328 ref. JAA 103

Most of our systems run on our large 1904S, but increasing attention is being given to distributed processing and use of small computers.

The post offers pleasant working conditions (we are on the outskirts of Sheffield) superannuation scheme, staff restaurant, active social club, flexible working hours

Application forms (to be returned by 6th October, 1978) and further details from the Regional Personnel Officer, Trent Regional Health Authority, Old Fulwood Road, Sheffield, S10 3TH, or telephone 0742 308511 Ext. 226 Quoting appropriate ref. no.

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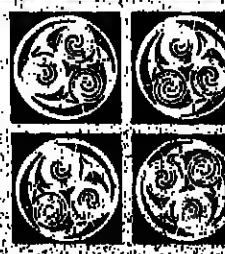
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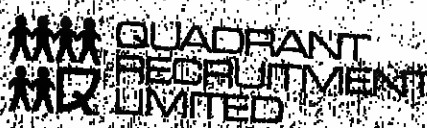
For further details contact Ruth Cayley at Quadrant Recruitment Ltd., Ashley House, Ashley Road, Altrincham WA14 6DB. Tel: 061 838 8302.

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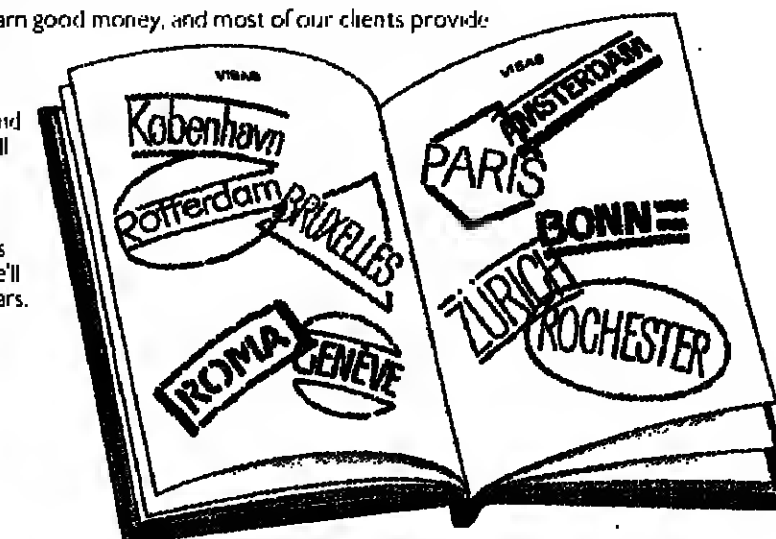
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A Programmer/Engineer is required to produce interface firmware in an environment incorporating Intel 8080/8085 processors interfacing the control panel to keyboard and to a CRT Controller. Knowledge of Intel 8080 and 8085 processors and related functions, particularly interfacing in such an environment is important, although knowledge of other microprocessors used in the environment could be acceptable. Ref. J88 110777B

BIT-SLICE SYSTEM SPECIALIST/AMD 2900 C £11,500 p.a.
A top flight specialist preferably with AMD 2900 experience is required to be responsible for the test logic (20-bit) bit-slice system. In addition to experience with the stated hardware applicants should have a solid digital design background. The level and nature of the experience already gained by the applicant is of more importance than age or qualifications, but it is envisaged that applicants will have completed HNC or BSC studies in a related discipline. For the right person the contract can represent a long term involvement in a state-of-the-art environment.

TECHNICAL AUTHOR C £11,000 p.a.
A writer is required, as soon as possible, to update and possibly create elements of operating manuals. A suitable candidate would be an ex-operator with JCL knowledge. A working knowledge of Dutch is most important. Ref. 08210878

SYSTEMS PROGRAMMER C £11,000 p.a.
A Systems Programmer is required to assist in systems software support. Candidates must have experience of MVS, JES 2, VTAM/NCP and the functional aspects of the system software involved. Ref. 082000378

SYSTEMS PROGRAMMER C £11,000 p.a.
A Systems Programmer is required to simulate the operational characteristics of system components (MVS loading, Batch, TSO, IMS and MVS) and to create and process batch mark systems in order to compare the relative functional capacities. A solid MVS background coupled with an in-depth understanding of IBM H/W factors and H/W, S/W, V/W components is essential. Additionally previous batch marking experience is highly advantageous. (Ref. 08220878)

BELGIUM

FORTHAN PROGRAMMERS/ANALYST PROGRAMMERS C £13,000 p.a.
A number of Fortran Programmers and Analyst Programmers are required to work in an industrial environment on the computer control (PDP 11) of the dispatch of power in a high power network. At least 2 years' full-time Fortran experience coupled with some knowledge of French is required. Ref. 0820778

ANALYST PROGRAMMER C £13,500 p.a.
We require an Analyst Programmer for a short term contract, with knowledge of Corel 86 and Assembly on the Farnit Argos 500. A package of £13,500 per annum will be paid for the right person. Ref. 08081478

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with around 2 years' experience required for our P.D.P. 11-40 using basic language. This would suit someone hoping to advance into Systems Analyst post in the near future.

We would prefer someone with R.S.T.S. experience. Salary £4,000-£5,000 depending on experience.

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Tel. 01534 4555

UNIVERSITY COLLEGE LONDON DEPARTMENT OF PHYSICS AND ASTRONOMY JUNIOR PROGRAMMER

required to join a team developing software for an interactive processing system being built for the analysis of data. We require a fully qualified computer science graduate with a good knowledge and a lot of enthusiasm. In addition we can offer an opportunity to work on large mainframe computers. Minimum experience: A degree in computer science or equivalent. A strong interest in physics and astronomy would be an advantage. Please send your curriculum vitae, with references, to the Department of Physics and Astronomy, University College London, Gower Street, London WC1E 6BT.

Starting salary in range £4,700 to £5,100 depending on experience and qualifications.

Further particulars and application forms from the Department of Physics and Astronomy, University College London, Gower Street, London WC1E 6BT.

IBM SYSTEM 3 OPPORTUNITIES SENIOR ANALYST PROGRAMMER 7½K

A dynamic company about to upgrade from a System 3/70/128 is looking for a Senior Analyst/Programmer to take control of all aspects of the transfer. Knowledge of COBOL and FORTRAN would be a distinct advantage.

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A young (22-30) Analyst/Programmer is required to make the installation of a new IBM System 3/70/128. The initial systems are being installed by a leading Software house and future plans include installing V.S.M. using on-line order entry. The successful applicant would be expected to move into Project Manager within a few months with a strong possibility of becoming a D.P.M. when the Software house staff leave in November, 1978.

PHONE — Please answer until 4 o'clock

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The Computer Centre is being established as a separate service prior to the installation of a large new computer system in 1979.

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Further details and application forms may be obtained from The Establishment Officer, The Polytechnic, Wulfrum Street, Wolverhampton, to whom completed applications should be returned by 7 October 1978.

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£10-£15,00 equivalent plus relocation and sundry expenses
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This client requires, either permanent or on two-year contracts, staff to work on the development of the software for their new range of equipment. If you have experience in the fields of:

- Operating Systems
- Software Tools, Housekeeping Utilities
- Language Development
- Systems Architecture

and would like to work abroad, this company may like to use your services.

(Ref: JDH1) Jenny Dalrymple-Hay, Beaconsfield (04946) 4579 (Home)

PROGRAMMERS PROGRAMMER/ANALYSTS

Central London

to £6,500 depending on experience

Programmers and Programmer/Analysts are required by this City company for the development of their P.D.P. 11 systems. If you have at least one year's really good programming experience, they will offer you training on their particular systems, and the opportunity of gaining a breadth of experience.

(Ref: JDH3) Jenny Dalrymple-Hay, Beaconsfield (04946) 4579 (Home)

ANALYST/ PROGRAMMERS

Central London

Up to £6,000

Geac Computers Limited, a Canadian manufacturer are continuing to expand in the U.K. and now need three analyst/programmers to work with teams installing on-line and database systems for clients. All programming is on VDU's using our own sophisticated software. You should have a minimum of one year's experience on commercial systems in COBOL, FORTRAN, BASIC or similar and enjoy liaising with user clients. Geac are a young, progressive and exciting company and are offering an excellent salary together with generous fringe benefits.

Jacqui Thomas, 01-979 3550 (Home)

CONSULTANT ANALYSTS AND PROGRAMMERS

SE England

to £7,000
profit share and travelling expenses

Our client, a leading software house based in Buckinghamshire, seeks analysts and programmers to work in its Mainframe Division. Staff are based on client installations, scattered throughout London and the Home Counties. Programmers need at least 3 years' commercial mainframe experience, preferably IBM, with a COBOL PL/1, Mark IV or Assembler background. Analysts need 5 years' experience, split between programming and analysis, and again an IBM background is preferable but not mandatory.

Tim Armstrong, Epsom (78) 25386 (Home)

AMERSHAM, BUCKS

This growing turnkey systems house and associated bureaux, service both the companies in the group and external clients' requirements. They use DEC hardware, RSTS operating system and mainly Basic, though Assembler or other high level language are used if applicable. Please contact us if you are interested in any of the following:

RSTS SYSTEMS SPECIALIST
PROJECT MANAGERS
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PROGRAMMERS

£8K
£6-£8K
£5-7K
£4-6K

(Ref: JDH2) Jenny Dalrymple-Hay
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PROGRAMMERS

London W1

£4-7000

Word processing is one of the fastest growing application areas in computing and electronics. A leading British company in this field has immediate openings for systems development and support programmers at all levels. Candidates who want to become completely involved in developing their talents in word and text processing and have experience in mini computer or micro systems should apply.

(Ref: JDH4) Jenny Dalrymple-Hay, Beaconsfield (04946) 4579 (Home)

SYSTEMS ANALYST

Berks

c. £6,000

An exciting opportunity has arisen for a systems analyst to work on line systems for our client, a major international company based in Berkshire.

You will need around 3-4 years experience, preferably on IBM equipment, and you should ideally also have a programming background.

Our client has attractive offices and is offering excellent fringe benefits together with a realistic salary.

Jacqui Thomas, 01-979 3550 (Home)

Manchester COBOL/RPG PROGRAMMERS

to £6,000

Our client, an expanding software house, wishes to recruit a number of programmers with at least 2 years experience of writing in COBOL or RPG for IBM or ICL hardware. Time spent with a software house will enhance your career prospects by giving you the opportunity to work on a wide variety of applications to professional standards.

Liz Segal 061 928 5495 (Home)

William Key

COMPUTER WEEKLY, September 21, 1978

37

4 Half Moon Street, London W1
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504/8 Corn Exchange Corporation Street
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HOLLAND

£10-£16,000 equivalent + car, etc.
MICRO COMPUTER SPECIALISTS

Our client is looking for Micro Computer Specialists who must have a minimum of two years' practical micro experience. The projects are software biased, though a hardware background could be an advantage as would automotive experience. The work will cover, for example, machine control, video control, special products, and many of the systems are being developed on a total turnkey basis.

(Ref: JDH6) Jenny Dalrymple-Hay
Beaconsfield (04946) 4579 (Home)

HOLLAND

To £16,000 equivalent + company car and perks
LANGUAGE SPECIALISTS
Designers and Implementation Consultants

Two Design Consultants with compiler construction and/or language design experience are required for work on an advanced language translation systems tool. Successful applicants will be responsible for the definition, design and implementation of the language translator and its installation. A knowledge of Assembly language programming and/or PL1 would be an added advantage but specific training in this will be given.

(Ref: JDH5) Jenny Dalrymple-Hay
Beaconsfield (04946) 4579 (Home)

HOLLAND

Rotterdam-Hague Area £12-15K plus car and perks
IMS SPECIALIST CONSULTANTS

Work on assignment with one of the international "Top 100 Listed" companies and have the long term option of permanent employment with them or a well-established systems house. The successful applicant will advise on the definition and implementation of new applications into their IMS database system.

(Ref: JDH7) Jenny Dalrymple-Hay
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EUROPE

Dutch based To £15,000 equivalent + car and perks
MUMPS
Designers and Programmers

Designers and Programmers with MUMPS applications experience are required for the development of medical, technical, and business systems in Holland and elsewhere in Europe. Applicants must have some MUMPS experience but an ANS MUMPS course will be provided.

(Ref: JDH8) Jenny Dalrymple-Hay
Beaconsfield (04946) 4579 (Home)

Software and Communications Specialist

Salary to £9000 + Car

London-based with travel opportunities

We are looking for a person who wishes to remain in a technical environment and utilise his/her skills in a sophisticated computing installation.

The position is based in West London with an International Company. A consultancy Division has recently been established to cater for the Group's corporate needs. This includes all computing services.

The installation has a DEC 20/40 with Weng terminals. DEC's database management system is used with supporting online and distributed processing for a European network. The Weng systems are used at two levels: at remote sites catering for local requirements, and additionally as front-end processors online to the mainframe in London.

We would like to meet someone with sound knowledge of online and real-time networks. Familiarity with DEC and/or Weng equipment (or similar) is desirable, plus in-depth programming and systems software experience.

Responsibilities include:—

- implementation and maintenance of systems on the DEC and Weng equipment
- writing software for both minicomputers and mainframe
- keeping abreast of local transmission requirements and updating data transmission software as necessary
- administration and maintenance of the database
- monitoring system performance and making recommendations for improvements as required
- liaising with other members of the Consultancy Division and advising on technical aspects of communications and operating systems software.

It is envisaged that future responsibilities will also include supervision of programming staff.

The European sites, which include Spain, France, Greece and Switzerland will need direct support and applicants must be prepared to travel overseas for short periods of time. An understanding of French or Italian would be helpful.

For further information please telephone Corinne Ingram on 01-828 5356, or forward a copy of your resume in confidence quoting Ref. 1934/CW.



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Current position _____ Salary required _____
Current salary _____

Locations in which you are willing to work _____

MACHINE EXPERIENCE List times/courses in appropriate boxes

Machines	IBM	VC	Novell	UNIVAC	Peripherals	Other	Others (specify)
Operating Systems							
Programming Languages							

GENERAL EXPERIENCE - Tick Box

	Operating	Programming	Analysis	Management	Sales	Others (specify)

SPECIFIC EXPERIENCE - Tick Box

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c £8,000 + Car

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You will be responsible for pre and post sale activities involving estimating, costing, etc. and the implementation of these systems to agreed budgets and timescales. Controlling your own team you will have total responsibility for successful implementation.

This important post will appeal to an ambitious entrepreneur, aged circa 30, with a sound track record of design and implementation of basic accounting systems. Sound project control expertise could be your passport to a board appointment in the not too distant future.

Please contact GEOFF MARSH on 01-499 4501 (24-hour answering service)

Ref. RW 38/1

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Software opportunities to stretch your abilities and expand your Bank balance in rural Berkshire.

★ £ NEG'L ★
(plus Relocation)

My client is a small systems house which specialises in the development of total systems based on PDP/11 hardware under RSX-11M. Systems are developed in RTL/2, Coral and Macro, and increasing use is being made of Intel 8088 microprocessors.

The company is young and small, so the working environment is congenial and stimulating. Your security is the financial backing and commitment of a major industrial concern. Your key to success will be your own talent and hard work.

There are openings at all skill-levels, and to reflect this, salaries up to and including £7,000 will be paid in appropriate circumstances.

Please contact me, TONY BAKER, on 01-499 4501 (24-hour answering service) for an initial discussion.

Ref. RW 38/2

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RPG2/CICS/SYS 3 Production Control
Long term — Belgium
1900 G3 On-line Various locations UK

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for more details of contracts with Hutchinson Scroggins Contracts Ltd.

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£4,000 - £8,000

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All positions are based to the West of London, although lecturing assignments in other parts of the UK (and occasionally Continental Europe) will sometimes arise.

In the first instance call TONY BAKER on 01-499 4501.

Ref. RW 38/4

hutchinson-scroggins recruitment
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KENT ANALYSTS AND PROGRAMMERS

THIS COULD BE YOU! — AT CHARTER CONSOLIDATED



I'm GEOFF — In 16 months at Charter

I have:

- ★ Been promoted
- ★ Increased my salary substantially
- ★ Had sole responsibility for a multi-national engineering cost control project
- ★ Travelled to Zambia on systems duties

Geoff is looking for an Assistant Analyst to help him develop his Engineering Project — potentially into ON-LINE and DATABASE. This position would suit an ambitious Programmer wishing to move into Systems or a Junior Analyst looking for more scope.



I'm MIKE — In 20 months at Charter

I have:

- ★ Been promoted
- ★ Increased my salary substantially
- ★ Worked on a multi-national currency dealing project using mini computers
- ★ And I shall shortly be travelling to Luxembourg on programming duties

Mike is looking for colleagues to work on several developments, including Geoff's, all involving new technology. A sound knowledge of COBOL is required for all programming posts.

CHARTER CONSOLIDATED is a major Mining Finance Company based in Ashford in Kent with worldwide connections. The Computer Centre operates an IBM 370/138 under DOS/VS with CICS/VS and POWER/VS and Computer Services are provided to many industrial subsidiaries as well as Charter itself, via an expanding RJE network. Plans calling for the installation of an IBM 3790 Distributed Processing System have already been approved and many other developments are envisaged.

A good academic background (Degree preferred for Analysts) is required for all posts and a salary in the region of £5500 is offered. Fringe Benefits include:

- ★ SUBSIDISED MORTGAGE
- ★ FREE LUNCHES
- ★ SUBSIDISED BUPA
- ★ GENEROUS RE-LOCATION PACKAGE

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JBA

Communications Specialist

London £9,000 + car
A newly formed computer function within an international group wish to appoint a Communications and Software Specialist to develop a European network based on a DEC 20 system.
Ideally the candidate will have a combination of experience with commercial systems development, selecting and modifying manufacturers software and design/implementation of a distributed network. Although this is a senior position, the job will involve a high degree of technical work, particularly in the initial stages.
Knowledge of one or more European languages would be an asset.
Generous salary and fringe benefits. Contact: Jim Baker

Consultants Information Retrieval Systems

London based up to £8,000
One of the UK's most established consultancies wish to appoint consultants with experience of computer information retrieval systems. The company is looking for technicians with a computer background but who have been involved in the implementation of a system in a library or documentation centre. Candidates should have some knowledge of at least one proprietary package in the field, such as STAIRS, STATUS, DIALOG, ASSASIN or ORBIT. Applicants will be expected to have the personality and communications skills to carry out client projects without detailed supervision. They should also be able to contribute to the continuing development and marketing of packages and services in this area. This is an opportunity to join a stimulating company with variety of work and good staff benefits. Contact: Margaret Stevens

Trainee Product Specialist

South East Herts c £4,500 + profits
This small but highly successful company new to the market for one with support programmer to join their team. Their business is customizing totally "soft" and extremely powerful micro-based intelligent terminals so once you have proved yourself, a great deal of travel as well as design and programming work will be involved.
Backed by a parent company in the USA, their growth has been tremendous, so there is a good deal of scope for individual career development — around £6/K + car can be expected within eighteen months to two years.
An ideal opportunity for a graduate with about 1 year's experience of Assembler, preferably on minis or micros. Contact: Andy Wright

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W1L Tel: 01-491 4478

IBM COBOL Programmers

Kent/London minimum of £6,500
Our London based client is a recently established software house, which already has a number of major contracts. The long term aim is to move into software development for which plans include the installation of a PDP 11 minicomputer.
The immediate requirement is for COBOL programmers, with a minimum of eighteen months IBM experience, to join their project team in Kent. Extremely generous salary packages are offered, with additional help available for relocation. Minimum basic salaries will be £5,000 pa, plus bonuses and profit share amounting to approx £1,500. More senior individuals can expect much greater rewards.
A phenomenal chance to be in at the start of what promises to be an extremely successful venture. Contact: Andy Wright

Senior Analyst Analyst Programmers

to £6,500
up to £5,900
up to £5,000

Herts/Essex borders

Our client, one of the foremost travel concerns in the UK, is expanding their department in order to carry out further major development of on-line and database systems. They currently utilise an IBM 370/138 running under DOS/VS with a teleprocessing network using SHADOW and DL/I. Bright and ambitious systems and programming staff are needed to augment existing teams. In return for skills in COBOL and analysis our client can offer the opportunity for programmers to become involved in team leadership, while fully-fledged analysts will take on project/management responsibilities. Attractive fringe benefits include cheap holidays. Contact: Margaret Stevens

NEW YORK

Systems Analysts circa \$29,500
We are seeking a number of systems analysts to undertake a project in the USA for a period of up to 18 months. The client is an international banking organisation based in New York.
Candidates must have direct experience of foreign exchange system, plus general banking and financial knowledge. The system will be implemented on large IBM370 equipment.
Interviews will be held in London and visas will be arranged for the successful candidates without delay. Contact: Mike Creamer



Data Processing Recruitment Consultants

Mark IV or IMS Washington, E.E.C., Scotland, London

Salary: \$30,000 + + (U.S.), £15K + (E.E.C.)

A prestige Multinational U.S. client require for their Washington office Mark IV programmers with at least two years experience. This position is permanent and the appropriate VISA will be applied for by the company.

specialists and one or two IMS internal Systems Programmers familiar with performance and prediction standards. Successful candidates are likely to be either graduates or have a very extensive solid background in advanced computer applications and should preferably be available by November. Interviews will be held in London early October. (Ref 25A)

Mini + Main-Frame Programmers Manchester + London

Salary: £6 - 9.5K

Our client is a major international company recognised as market leaders in their field and has retained Logistix to assist in recruiting the following key project team specialists: Real-time mini programmers, Data base designers, compiler specialists, communications experts (Mini and Mainframe) Application and Software programmers. Experience of any of the following will be especially welcome: RSX-11, RTL11, BASIC, ASSEMBLER, PL/I, COBOL, IMS and

D.B. For those who enjoy overseas travel there will be ample opportunity to visit European and Middle East locations at which our clients have offices. Successful applicants are likely to demonstrate qualities of leadership potential, determination and be self-starters. It is anticipated that you will achieve very rapid promotion within this prestigious company. Interviews will be held as soon as possible and offers will be made within 1 week of interview. (Ref 25B)

Message Switching + Communications London, H.Counties or E.E.C.

Salaries: £6.5 - 11K

A prestige International Client is seeking to expand and establish new project teams working on wide and varied applications areas with emphasis on Data Communications, Message Switching and Mini Software.

Can you picture yourself working in the forefront of mini systems applications and software development? Become a member of one of our numerous specialist project teams in which you will make a valuable contribution whilst at the same time expanding your own frontiers of knowledge and experience.

This is a unique opportunity to enhance your career by extending your horizons and developing State-

of-the-Art D.P. technology. Successful candidates are likely to be either graduates (Computer Science or Maths) or have a very solid background in advanced computer applications and are probably aged between 23 and 33. You are presently likely to be either a Systems Designer/Consultant, Analyst Programmer or a programmer in a Mini computer environment with extensive Assembler experience. Any specialist expertise in the areas of Data communications, Message Switching, computer networks, Process control or Mini computer software will be considered particularly advantageous. (Ref 25C)

IMS + Database Germany + London

Salaries: Germany £15K + London £7K +

One of the World's foremost Software Specialist Groups (not body shop) with H.Q. in the U.S. have asked Logistix to identify top calibre IMS programmers up to Team Leader level and beyond for permanent positions in Germany and London with the option to transfer for a limited or extended period to the U.S.

Suitable applicants must have current IMS (DB or DC) applications or systems programming experience using COBOL, PL/I, or BAL with DL/I. It is anticipated that candidates will have worked

with IMS applications for 2 years or longer. Applications cover on-line enquiry systems, banking, sales ordering, stock/inventory control, budgeting and forecasting etc. The scope of projects and the prestige of working with this acclaimed Market Leader will be certain to appeal to the most demanding career minded individuals. The high salaries reflect the prominence which our Client places on the acquisition of these key personnel who are certain to rise rapidly to Consultancy or Management levels. (Ref 25D)

PL/1 Programmers City of London

Salary: not less than £6K up to 9K Plus Mortgage

An Important International financial institution based in the City is expanding its team members and is seeking PL/1 programmers at all levels up to and beyond team leader level. Ideally, you will have around 3 years of solid PL/1 experience under C/S and will either have on-line expertise or a desire to move into this area of Data base design through participation in our Client's training programme. Of particular importance is the ability to work as a

member of a specialist project team under strict documentation and programming standards. A second language (COBOL or Assembler) would in addition be considered advantageous. Our client offers a 2 1/2% subsidised mortgage, personal loan scheme, private health and a non-contributory pension plan. Interviews will be held in London during the next 3 weeks. (Ref 25E)

Logistix, Freeport 32, London W1E 3YZ
01 491 4636
(Reverse charges)
Telex 28800



Avon House, 356 Oxford Street, London W1N 9HA

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

IBM/OS SPECIALIST

BERKS./BUCKS.

To £8,500

This is an unusual position offering exceptionally interesting and varied assignments affording the opportunity to gain a wealth of experience in a complete range of manufacturers large machine operating systems.

Equally involved with the internals of OS and the overall capability of the system the successful candidate will be required to advise in its operation and assist with the creation and development of sophisticated software.

Candidates should possess considerable expertise with OS and be capable of analysing and reporting on specific features at both technical and senior managerial levels.

The appointment will enable the person appointed to enhance their existing knowledge whilst simultaneously acquiring detailed experience of competitive manufacturers systems.

Conditions of employment are excellent within an organisation offering a secure future.

Ref. N2/2109

24-hr. answering service
Please telephone for a confidential
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30 Fleet Street London EC4Y 1AA
01-353 0981

£10,000

How to make it with Real Time Mini

We can tell you any number of ways.
For instance, if you have RTL11 — with, if possible, RSX11M operating system experience — it's probably a cinch.
Or if you have Macro II or Coral or Assembler level or any high-level language.
Or, among the micros, Intel 8080 or 8085.
Because software houses and manufacturers and users all over London and the Home Counties are itching to fork out the big money for people like you.

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Software Engineers
Applications Programmers
Systems Designers
John Travolta or Olivia Newton-John
Yes, either sex — or, indeed, both

Particular applications:
Micro processing, word processing, process control, message switching, flight simulation, radar systems, automated telex systems, communications, diagnostic programming, video typing systems, composition and typesetting, etc.
All you have to do, if you have what it takes, is chat up Beryl McLaren on 01-836 8719 or 8862.

Jupiter

Computer Appointments
(Real Time Mini's Place)
Suite 43, 12-13 Henrietta Street
London WC2

Programmers

before you
read the papers,
mow the lawn,
walk the dog,
or pop out to
the pub this Sunday..



When you're looking for a career move, it isn't always easy to take up the best opportunities. You may not want to commit yourself in writing and you can't phone during office hours because even the walls have ears!

At IDEC we understand the problem — we appreciate that people like yourself care too much about responsibilities to keep taking time off to 'do the round'. Now we're offering you an alternative. Today we'll be manning our phone to talk to you about our top opportunities in 'State of the Art' Software Development.

IDEC is one company that stands up to the test. We genuinely believe that the offer we are making to talented Real Time Programmers, at every level of experience, is second to none. The exposure we give you 'at the sharp end' of 'State of the Art' Software Development will be invaluable to your career, the rewards are high and job satisfaction considerable.

IDEC is the design and development centre of IIT Business Systems and Communications Group, based on the London/Herts border and Sidcup in Kent.

We are responsible for the major software development activities of the new products marketed by this worldwide organisation.

For the best professionals, dedicated to advanced software development, we offer opportunities in: REAL TIME, SOFTWARE ENGINEERING, MICRO PROCESSORS, DISTRIBUTED PROCESSING, COMPILERS, DATA COMMUNICATIONS.

We're looking for people with potential at any level — Good Programmers with one year's experience, high flyers in their early twenties right up to the seasoned software veteran at the top of the ladder. In whatever position you join us you'll be surprised how much we value your expertise and how well we reward it. Some of our Software experts are on salaries of £10,000 p.a. or more!

So today before you mow the lawn, walk the dog or pop out to the pub, phone us on Potters Bar 51199 between 9.30am-5.00pm.

Alternatively, call us any weekday or write to:
Sue Cameron, IDEC, IIT Business Systems,
Canada Life House, Potters Bar, Herts.

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SALES: MARKETING: APPLICATIONS

Success standards are changing. Striving for a way to meet the old standards. Today the successful man's world is the world. The whole world and nothing less than the world. That's why more and more electronics and computer professionals are turning their eyes toward Texas Instruments, the world's technological frontiers. Not only in the industry offers more opportunities in the international scene.

We want you the ambitious electronics or computer engineer who wants what Texas and the world has to offer. The experience of working with the latest, state of the art products. The challenge of solving new problems. The enjoyment of dealing with people and projects in all their fascinating international variety. The opportunity of really rapid personal growth, travel and early responsibility. Rewards that make your ability and success. Benefits, including generous relocation assistance where appropriate, that you'll find hard to beat.

Right now we have the following opportunities:

SALES

We are looking for sales engineers with appropriate experience, or electronics/computer/data terminal engineers qualified to at least 11C/degree level with practical post-qualification experience and the right personal qualities for the following areas of our business:

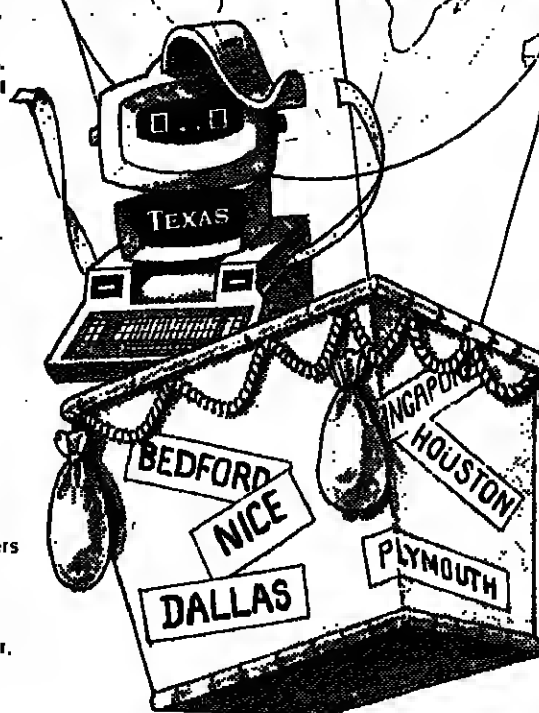
ELECTRONIC COMPONENTS covering Industrial, Consumer, Computer, Telecommunications or the whole range of customers in territories throughout England, Scotland and South Wales.

MINI-COMPUTERS based in Slough or Bedford. Sales, marketing or applications experience is essential.

PROGRAMMABLE CONTROL SYSTEMS based in Bedford or elsewhere in Southern England. At least 2 years' sales and applications experience in Industrial Control Equipment is essential.

BUSINESS EQUIPMENT to cover North London. Selling our range of data terminals/calculators/programmable control systems.

GRADUATE/HNC ENGINEERS to work as Internal Sales Engineers based at Bedford or Slough and to train for Field Sales.



To find out more

about these opportunities, the benefits packages and to get an application form please telephone 01-629 1844 at any time or write, quoting ref. FY.8291, to ASL Recruitment Advertising, 17 Siratton Street, London W1X 6DB.



TEXAS INSTRUMENTS LIMITED

TEXAS INSTRUMENTS - ONE STEP AHEAD

MARKETING

We are looking for experienced marketing engineers or qualified engineers with relevant technical experience to provide specialist technical and marketing support for our field sales operations. All appointments are Bedford based, though UK and overseas based may be involved. There are opportunities in the following areas:

MICROPROCESSORS AND MEMORIES
INTEGRATED CIRCUITS
DISCRETE COMPONENTS
MINI-COMPUTERS
DATA TERMINALS
DISTRIBUTED PROCESSING SYSTEMS
PROGRAMMABLE CONTROL SYSTEMS

APPLICATIONS

We are looking for experienced applications engineers or qualified engineers with experience in the following areas to work, based at Bedford, with customers and our field sales force problem-solving on a wide variety of applications:

MEMORIES
TELECOMMUNICATIONS
MICROPROCESSOR HARDWARE AND SOFTWARE
COMPUTER PERIPHERALS
INDUSTRIAL SYSTEMS

We also have opportunities for:

FIELD SUPPORT ENGINEERS with mini-computer hardware and/or software experience based Bedford.

TECHNICAL AUTHOR qualified as an electronics engineer with a good command of English. Based Bedford.



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TEL: 01-240 3223

PERMANENT REQUIREMENTS (SOUTH)

Location	Job	Salary
City	RPG II Programmer	£5K+
Surrey	Analyst - Excellent Benefits	to £6.25K
C. London	Programmer - Basic + RSTS	to £6.5K
Herts	Programmer - PL/1: OOS	£ Nag.
City	Analyst - Lga. Commercial Sys.	a £6K
Surrey	Analyst Programmer - COBOL	a £5.8K
Wilts	Analyst - Insurance Exp.	£Nag.
City	Snr. Programmer - PL/1	to £7K

We always have a number of clients with vacancies for programmers and analysts of all disciplines, so if you're looking for a change:-

CONTACT Marilyn Davidson - NOW

Agency Licence Number SE/A/2848



Glynwed Group Services

Systems Analyst

Birmingham Area

Glynwed Limited is a major British engineering group with a turnover of over £300 million employing 14,500 people. Companies within the Group manufacture, sell and distribute materials, components and finished goods to the building and engineering industries and consumer durable markets.

The Central Resources Unit (CRU) located at Shirley near Birmingham was set up in 1976 as the focal point for marketing and product/process development for the Glynwed Group, and an appointment needs to be made at this establishment for a

SYSTEMS ANALYST to work on an advanced energy conservation project. Candidates will have the capability to resolve complex prediction and optimisation problems with the aid of a computer facility together with an ability in program development and results analysis. An education to engineering degree level and direct experience of computer techniques, including the use of Fortran, are necessary attributes for this role.

Terms and conditions of employment are good. Candidates, male/female, should write or telephone for an application form to:-

R. Withey, Group Staff Manager,
Glynwed Group Services Ltd.,
Headland House, New Coventry Road,
Sheldon, Birmingham B28 3AZ.
Tel: 021-742 2386.

GLYNWED

INNER LONDON EDUCATION
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LONDON COLLEGE OF PRINTING
SCHOOL OF SCIENCE
AND TECHNOLOGY
SENIOR LECTURER IN
COMPUTER
TECHNOLOGY AND
INFORMATION SYSTEMS

The Senior Lecturer is required from 1st September, 1978, or as soon as possible thereafter to lead development in Computer Technology in the College.

This is a particularly challenging post to those who have the necessary drive and enthusiasm, both to be responsible for computing throughout the College and to identify and expand those areas of the College's work where computing is applicable.

The successful candidate should ideally be a graduate in Computer Science and/or a member of the British Computer Society and will be capable of teaching within Honours Degree programmes and furthering research in the area.

Appropriate industrial experience would be advantageous.

Salary in accordance with Birmingham F. E. Report £501-£700 (Dart-C2572) subject to formal approval, plus 60% Inner London Allowance.

Further details of the post and an application form, returnable within 14 days may be obtained from the Senior Administrative Officer, London College of Printing, Elephant and Castle, London SE1 5SE. Tel: 754 944 (Ext. 227).

ASSEMBLER PROGRAMMERS

TO TRAIN ON MICRO

Dagwood Ltd. is a rapidly expanding force in the POS market. We urgently require the very best people to join a small enthusiastic team.

Currently shipping 80 computers per month we forecast a 10 fold increase by the end of 1979. If you would like to adapt your experience to micro this is your opportunity.

FOR THE RIGHT PEOPLE WE ARE PREPARED AND ABLE TO BE EXTREMELY GENEROUS. Please telephone Woking 0334 2242 to talk it over or write with C.V. to OMG House, Boundary Road Woking.

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urgently required for three positions (industrial, scientific and commercial) in the following areas:

SALARIES £13,000

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037 5551 day, 636 9659 eve

ANALYSTS/PROGRAMMERS

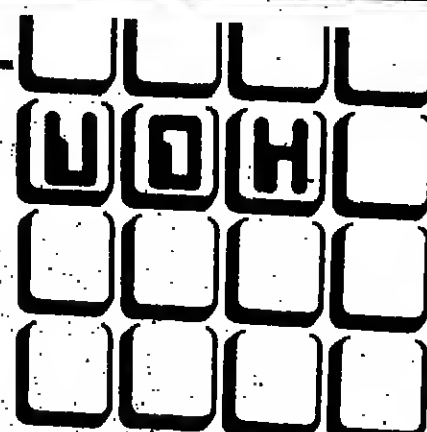
South Coast Up to £5,800

Our client, an International leader in digital communications systems, is looking for Analysts/Programmers with at least three years' experience in computer systems. They will be required to develop software, to diagnose faults "on line" within the hardware and digital computer systems which contain a large number of specialised peripherals. If you have a hardware/software background, our client would be particularly interested in hearing from you. Our client's offices are based on a beautiful part of the South Coast where moderately priced housing is available. The Company offers a superb relocation package and a career structure tailored to suit your specific expertise. In the first instance, please ring Peter Findlay on 01-378 6030 Ex G11 or write, quoting ref. PR.15.

Thurloe Executive

The Gloucester Hotel, 4-18 Harrington Gardens, London, SW4 4LP.
Telephone 01-373 6030

Consultants International



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UDH Automation Limited is a recently formed bureau in North London providing extensive D.P. support to a major retail chain.

To develop our bureau business we need an experienced Programmer with systems design potential and a Senior Systems Analyst with a programming background. Good COBOL Programmers are always an asset.

Our most attractive hardware includes a 1 Megabyte virtual memory state-of-the-art mainframe moving into on-line and TOTAL Database systems in addition to extensive batch work.

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Please write to:

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Edgware, Middlesex HA8 7AQ

or telephone 01-952 7788 for an application form

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TO THE SHIPBUILDING INDUSTRY (BASED SCOTLAND)

c £6500 + BONUS + CAR ALLOWANCE

Our clients, a major international company, wish to recruit a customer support analyst to join a specialist team involved in the forward development of computing facilities within the shipbuilding industry.

The position is based in Scotland and may involve periodic visits to computer installations in the U.K.

The successful applicant will ideally have a background in naval architecture, and a general awareness of computer systems within the shipbuilding industry. A knowledge of B S R A software would be advantageous.

This interesting position offers a salary of c £6500 plus excellent conditions of employment including participation in the group productivity scheme. A generous car allowance is also offered.

Interviews will be held locally and where necessary relocation assistance will be given to the successful applicant.

For further information and to arrange interview telephone 031-226 5381 or write enclosing details curriculum vitae to:

ATA COMPUTER RECRUITMENT
ANGLIA HOUSE, 26 FREDERICK STREET
EDINBURGH EH2 2JR

LONDON (01) 637 0781 MANCHESTER (061) 832 5856 BIRMINGHAM (021) 643 1994
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The speed of technological development in present day computing is such that in a diverse engineering group with varied potential applications requiring use of the most appropriate techniques, it is necessary to develop a high level of expertise in the latest hardware facilities that are becoming available.

Accordingly a person with a suitable background is now required to develop this role. Computing experience is likely to include several years in programming and systems analysis, preferably in an engineering environment, and possibly some form of technical exposure with an electronic equipment manufacturer and/or by formal qualification.

It is likely that the ideal applicant will view this important step in his/her career as an opportunity to gain front line exposure to the latest technology whilst in an organisation that is enthusiastic to utilise it to its best advantage.

The company is based in Scotland and offers a salary that will reflect the experience demanded to carry out this important role. Relocation assistance will be available where necessary. For further information, telephone 031-226 5381 or write enclosing details curriculum vitae to:

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ANGLIA HOUSE, 26 FREDERICK STREET
EDINBURGH EH2 2JR

LONDON (01) 637 0781 MANCHESTER (061) 832 5856 BIRMINGHAM (021) 643 1994
BRISTOL (0272) 211035 EDINBURGH (031) 226 5381 CRAWLEY (0293) 514071

Ref no 121A

COMPUTING AND MANAGEMENT SYSTEM GROUP

Programmers

£3,732-£4,632 (inclusive) 2 posts

The computing group provides a technical advisory and programming service to all departments which has a wide range of computer facilities including a remote batch terminal, teletype, graphics, programmable calculators and electric card punches. Considerable use is made of the County's own 1904S and 1904S computers which are in operation 24 hours a day. The group also provides computer training.

Two programmers are required: one familiar with FORTRAN and BASIC, to provide support with a full range of support in the field of highway and structural design; the other preferably experienced in COBOL and/or FIELAB to assist systems analysts develop management information systems, including the use of database techniques.

Essential qualifications are a formal education to 'A' level standard and a minimum of 2 years programming experience on 1904S/1904S computers.

Technical Assistant

£1,821-£3,661 (inclusive)

To assist with data processing, terminal operation, program running and many other technical and administrative aspects of day to day work.

Applicants must have 'O' level education, be well organised and be able to work in a tight schedule. Some experience of computer operation would be an advantage.

For further details phone John Hanney, Maidstone (0622) 671411 (ext 3756).

Job description and application form returnable by 6 October to the Personnel Officer, Highways and Transportation Department, Kent House, Inver Stone Street, Maidstone (postcode QF20B).

COMPUTER ENGINEERS

FOR THE WEST COUNTRY

Western Accounting Systems - A rapidly expanding computer sales company require experienced field service engineers able to repair to chip level and maintain their range of Disc based Mini Computers at customers installations around the West Country. If you feel that you have the experience which we are looking for then please contact either Richard Gargie or Roger Ford on 0934 415398 or write to:

WESTERN ACCOUNTING SYSTEMS LTD

4 Wincote Road
Weston-super-Mare, Avon

SENIOR PROGRAMMER

Salary up to £7,230 per annum

CAN YOU HANDLE AN ON-LINE SYSTEM?

Thames Valley Police are looking for an experienced Senior Programmer to perform development and maintenance work on a computer on-line system. A challenging series of extensions to this system and to associated IDS batch programmes is envisaged.

The successful applicant will have extensive COBOL experience on an on-line system, preferably but not exclusively with Honeywell 6000/level 86 using IDS & TDS. He/she must be willing to take an increasing interest in the maintenance of existing software and be capable of working to high standards. He/she will also have the ability to communicate at all levels.

Over 6 weeks' holiday; pension scheme; assistance towards removal expenses.

Application form and further particulars from: Personnel Officer, Thames Valley Police, Officers, Kidlington, Oxford OX5 2NX (Tel: 01493 401287).

'People who work in RPG II should not become nursemaids'



[Altergo Business Systems, 1st Career Principle]

Working on one installation for one user, that's just what happens, right? You put all your skill in and once the system's set up there's not much left to stretch your ability. Time, perhaps, to move to a more demanding situation which never lets up on you.

We're an autonomous company within Altergo, the most professional software group in this and thirty other countries. We're young, aggressive and talented — established as the specialist leaders in RPG II in a relatively short time — and we're looking for analysts and programmers who think they can match our reputation.

Tedium is one thing that's not part of our career plan for you. For a start you'd be changing project no less than every nine months. Which means a lot of different problems, on constantly varied applications in different industries.

Then there's equipment. We want people experienced on hardware extending from IBM 3234 to system 3 Model 15D and we can promise you the most contemporary hardware available. And finally, your commercial prospects. Leaders we may be, but we've only just started towards our long term aim. Join us and we'll be asking for an enthusiastic commitment to a policy which seeks out and recognises individual achievement. Within the structure, there's no limit to where you can go.

Geographically, you could stay in your general location or travel far and wide. Either way you'll be well paid. Come and talk to us if you have ambition and you want career scope. Contact Barry Whiteside on 01-734 9681 for interviews in London, Birmingham or Manchester. Or write to him at: Altergo Business Systems Limited, Warwick House, 38 Soho Square, London W1.

altergo

SALES EXECUTIVE 10K + VOLVO CAR

This Dynamic American Company has opened an office west of London and is looking for 2 young salesmen to spearhead its approach on the U.K. market.

Whilst experience of IBM Mainframe (or PCMC equipment) would be a distinct advantage, candidates with a successful sales record in the field would be actively considered.

PHONE NOW — (Mums answer until 8 p.m.)

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£6,750 + car

Frequent travel to Europe and Florida, U.S.A.

At least 3 years' Assembly required, previous experience in trouble-shooting of real-time systems, or typesetting/word processing background would be desirable.

If you can meet this demanding yet rewarding challenge, contact Terry Welch, Technical Support Manager, or:

E. M. Grant Scarfe, Personnel Manager
Harris Systems Limited
145 Farnham Road, Slough, Berks. SL1 4XD
Slough 34666

KEY COMPUTER PERSONNEL
01 949 3140

MEMO



To **TRAINING OFFICERS**
Subject **CORAL 66 COURSES**

The next Systems Designers CORAL 66 training course is on

* 30th October in Farnborough Hants.
Cost: £210 - Residential: £315

One week intensive course produces effective CORAL programmers through the use of proven, worked examples.

Course organisers are premier suppliers of CORAL 66 compilers to industry.

Details from Corinne Rixon
Systems Designers Limited
Systems House, 1 Pembroke Broadway, Camberley, Surrey. Telephone Camberley (0276) 62244.

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

OPPORTUNITIES IN THE CITY... TO £8,000

Over 10 years' successful computer bureau offering a wide range of services primarily to the investment community within the top class professional and corporate sectors. Immediate plans include the upgrade of the mainframe hardware to an IBM 370/148 and considerable enhancement of TP facilities including the use of IBM Series 1.

SYSTEMS PROGRAMMER

To £8,000

You must be able to write in COBOL, BASIC and POWER-VS system generation and maintenance. An appreciation of QICS-VS, job processing, VSAM or VM 370 would be a considerable advantage. You will join a small team responsible for further developing the sophisticated software environment in which batch, TP and RJ services are provided.

APPLICATIONS PROGRAMMERS

To £6,000

You must be able to offer solid Assembly experience, ideally gained under OOS-VS, although experience of a compatible language would be an acceptable alternative. You will join a department using IBM ASSEMBLER to develop some of the most advanced investment services available in the world. The company offers excellent working conditions and the technical challenges of the fast moving bureau environment. A policy of promotion from within will enable you to develop a career path related to your own efforts and abilities.

Ref H3/7109

24-hr. answering service
Please telephone for a confidential discussion or write to:
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01-353 0981

OPERATOR / PROGRAMMER

- * Minimum £4,200 p.a. + £6.25 Lvs per week
- * Hours 9 a.m.-5 p.m.
- * Plus usual benefits

West End Oil Company has an immediate vacancy for an Operator/Programmer aged 23+ wishing to learn Date Base Programming. Successful candidate, male or female, will have operated an IBM System 3 Model 15 Computer for a minimum of one year and have some R.P.G. II programming experience. It will be an advantage for candidates to have completed an appropriate IBM programming course. Please telephone Miss S. Miller on 01-437 9876 for an application form.

Caltex (U.K.) Limited
30 Old Burlington Street
London W1X 2AR



DUNDEE COLLEGE OF TECHNOLOGY COMPUTER CENTRE

Applications are invited for the newly established post of

SYSTEMS MANAGER / Deputy Director of Computer Services

ensuring from expansion and a recent reorganisation of the staff structure of the Computer Centre, which is responsible for all computer services used in the college. The main function of the post will be the management of the Analysis/Programming Section, which provides software for a variety of interesting technical and commercial applications, systems programming support and an advisory service to users of the college's OCSYSTEM 20 and POP-11 computers. In addition the person appointed will deputise as required for the Director. Applicants should preferably have considerable experience of leading a programming team and of computer services in higher education. Salary on the scale £2155-£7882 p.a. Financial assistance towards the cost of removal expenses may be payable.

Further particulars and application forms may be obtained from the Administrative Assistant (Establishment), Dundee College of Technology, Bell Street, Dundee DD1 1HG, to whom completed application forms should be returned by 9th October, 1978.

COULD YOU TEACH SOFTWARE?

If so, the reading of this advertisement could be the smartest move in your career. You may or may not have had teaching experience. You will have been involved in commercial or real time software systems.

Who are we?

We are Educational Services, an important part of Digital Equipment Co. Ltd., the world's largest manufacturer of mini computers. Our training centre in Reading has 18 classrooms, 30 dedicated computer systems and a staff of more than 70 people for running both hardware and software courses.

What do we do?

Our software courses cover:

- introduction to mini computers
- programming languages (Assembler, BASIC and COBOL)
- real time and commercial applications
- in depth instruction on the internal workings of our own software operating systems (RSX-11, RT-11, IAS, RSTS and VAX/VMS)

What do you need?

If you consider you have the ability to contribute in these areas we will give you the training and opportunities to develop.

What do we offer?

An exciting and challenging job in a friendly atmosphere with ample opportunity to develop technically or into management. The salaries being offered are between £5,600 and £7,500, according to experience, and the fringe benefits package, including assistance with relocation where appropriate, is that to be expected from a progressive international organisation such as Digital. For further information please call Ann Jones on Reading (0734) 583555 Ext. 3462, quoting ref. no. 440; or write to her at Digital Equipment Co. Ltd., Fountain House, The Butts Centre, Reading RG1 7QN.

digital

TIMES NEWSPAPERS LIMITED

SENIOR PROGRAMMER £7,000

Times Newspapers Limited are currently implementing one of the most advanced computer based newspaper production systems in the U.K., utilising data base and real time techniques on a network of mini-computers.

A Senior Programmer is required who will be responsible to the group Data Processing Executive for all aspects of software development.

Applicants must have at least five years' mini-computer programming experience, preferably using Hewlett-Packard equipment, and be capable of communicating with all levels of staff and of planning and controlling software development projects. Additionally this position requires several of the following attributes:

- A working knowledge of FORTRAN IV and Assembler languages
- Experience of real time and database processing techniques
- The ability to write interface software for non-standard peripherals
- Experience gained in either the newspaper or publishing fields

Salary negotiable depending on qualifications and experience.

Please write with full personal and career details to

Diamond Hayes, Employment Manager
TIMES NEWSPAPERS LIMITED
200 Gray's Inn Road, London, W.C.1

Software Analyst/Programmers

£4,400 to £5,800 - West Country

Our client is seeking several Analyst/Programmers to join a small high-calibre team of software professionals. The team is at present working on the design, coding, testing and integration of software programs, with particular reference to Real Time applications.

These opportunities should be particularly attractive to men or women who possess the following qualifications:

- * A minimum of HND in Mathematics, Computing Science or an equivalent qualification
- * Experience of Real Time Software
- * Experience of PDP 134, 40, 60, Argus 700 and Ferranti RM600

* Experience of C, Fortran, Algol and Pascal.

Attractive salaries depending on experience and qualifications are offered, together with a wide range of company benefits and realistic relocation expenses to a very pleasant rural part of the West Country.

Please write with full details to: Ref 643, Harrison Crowley Recruitment, 35, Queen Square, Bristol BS1 4LU. Please list on separate sheet companies to which your reply should not be forwarded.

HCR
Bristol

DUNDEE COLLEGE OF TECHNOLOGY COMPUTER CENTRE

Applications are invited from suitably experienced persons for three posts:

**COMPUTER OPERATIONS SUPERVISOR
COMPUTER OPERATOR (TECHNICAL)
COMPUTER OPERATOR (TRAINEE)**

arising from expansion and a recent reorganisation of the staff structure of the Computer Centre, which is responsible for all computer services used in the college. The main systems used are DECsystem-20 for Timesharing and Batch and a PDP 11/60 for Real Time and Graphics applications.

The Computer Operations Supervisor will be responsible for the supervision of the Operations Section, which provides support for the operation of computer facilities, including equipment operation and maintenance, data preparation, job control and assistance to users. Applicants should have experience of computer operations in a senior capacity. The salary scale will be £3,369-£4,773 p.a.

The Computer Operator (Technical) will assist with the operation of computer equipment and will also provide technical support for the installation and maintenance of equipment, including terminals, data communications and microprocessor systems. The salary scale will be £3,561-£5,831 p.a.

The Computer Operator (Trainee) will be a young person with suitable qualifications and aptitude for training in the operation of computer equipment. Initial appointment will be on the scale £1,884-£2,899 p.a., there is a provision for advancement to Computer Operator on the scale £3,278-£5,831 p.a. after satisfactory completion of the period of training.

Financial assistance towards the cost of removal expenses may be payable.

For particulars and application forms may be obtained from the Administrative Assistant (Establishment), Dundee College of Technology, Bell Street, Dundee, DDD 1, to whom completed application forms should be sent by 1 October 1978.

**Assembler/Usercode Programmers
Come to New Zealand****Large system project opportunities
£6000 - £7750**

The continuous expansion of a large banking system requires to find additional experienced

You will join a successful project supporting one of the largest on-line systems in the Southern Hemisphere. This is a critical system linked through three regional communications to a nationwide terminal system, soon to reach the 500 terminal mark with more to come.

Specifically we are looking for an experienced Assembler Programmer/Specialist to support a central system 4 based on-line system using drive multi-threading techniques. Experience in teleprocessing techniques is an obvious advantage and applicants should be able to communicate easily with both technical and non-technical staff as this is a first line customer support function.

The project is based in ICL New Zealand's Head Office in the centre of Wellington City and overlooking the harbour. Reasonable relocation expenses will be reimbursed by the Company.

If you like the idea of plenty of sun and the outdoors, away from crowds and commuting, then write to: Ian D. Hocking, International Division, ICL, Bridge House, North Point, London SW6 3LN, quoting reference: ICL/ICL/1007/272/1/1/2047.

International Computers

Think computers - think ICL

**Real Time Coverage Programmers**

Continuous expansion of BABS, our REAL-TIME COMPUTER SYSTEM, offers an opportunity for experienced men and women to join a small team of Coverage Programmers at Heathrow Airport to gain valuable experience in large real time system's control, data base management, and operations. Salaries will be in accordance with qualifications and experience and start around £4000 pa with opportunities for progression to more senior positions up to £7200 pa and beyond.

British Airways REAL-TIME COMPUTER SYSTEM provides a worldwide, round-the-clock Passenger Service System which includes Reservations, Departure Control, Fare Quotation and Ticketing. The system is currently based on 370/168 CPUs under the Airline Control Program (ACP) Operating System, with 42 x 3330 and 4 x 2305 online modules handling approximately 2 million enquiries a day from over 3000 on-line terminals. The introduction of more powerful processors is in the planning stage.

The main responsibility of the Coverage Programmer Group is to ensure that the stringent serviceability requirements of the system (over 99% up-time) are met. Coverage Programmers work closely with all programming groups, Operations and Engineering staff to control the system, and when necessary, rapidly diagnose system

problems and to take corrective action. This function may often be performed without recourse to other programming staff. Coverage Programmers also have responsibilities in the areas of performance monitoring, systems testing, establishment of recovery procedures, and for producing utility programs which contribute to the overall security of the system.

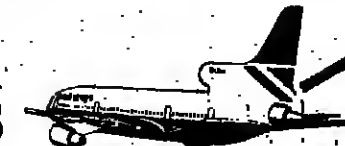
Candidates should have a minimum of 1 to 2 years commercial programming experience, preferably using Assembler language. Additionally, experience in systems programming, or systems initialisation, unit control would be an advantage.

As one of the world's leading international airlines, British Airways offers excellent conditions of employment which include a holiday pay supplement, inflation-proof pension scheme, subsidised catering sports and social facilities and favourable holiday air travel opportunities.

Please telephone 01-897 3346/3347 between 9 am and 4 pm for an application form or write quoting reference 2117 CW, MK to: Head of Recruitment and Selection, British Airways, PO Box 10, London Heathrow Airport, Hounslow, Middlesex, TW6 3JA.

British Airways welcomes applications from suitably qualified Registered Disabled persons.

British airways

**Bravingtons LTD
SYSTEMS ANALYST**

This is an opportunity for an outstanding systems analyst with full programming experience to be responsible for all aspects of systems support.

To investigate and document present systems, write machine specification for machine manufacturers, specify programme, arrange software contracts, eventually control machine installation, programme testing user manuals, etc.

When the machine is on line you would be responsible for day-to-day control and investigation of further systems.

We investigate initially, stock control and sales analysis applications with eventual full accounting functions to be transferred to computer.

We offer the opportunity to become fully involved in all aspects of computer operations and management.

The rewards include franchise salary, free life assurance, free pension, 3 weeks annual leave plus statutory holidays.

Please write initially with full curriculum vitae to: Mr. J. W. Bexley, Chief Accountant, Bravingtons Ltd, 254/260 Ebury Road, London N1 3NX.

Programmers

Salary up to £4,917

The Computer Section is responsible for developing and maintaining a variety of systems on the Council's 1902T installation with communications equipment. It currently have vacancies for three programmers.

We want

- * Programmers with at least 6 months' experience COROL or PLAN
- * Experience of ICL 1900, but programmers familiar with other machines will be considered

We offer

- * A salary up to £4,917 p.a.
- * An annual leave entitlement of 20 days PLUS 10 days' leave per month
- * Pension scheme, subsidised staff restaurant and other benefits
- * Programming for an interesting variety of applications. Current developments include system testing with accumulation to the elderly, superannuation records, children's benefits, and with foster parents, and the introduction of online interchanges for rates and rents
- * The opportunity to progress. If you show the interest and ability to do so, you will receive program specifications and design briefs, and the guidance of an Analyst or a first supervisor.

Please contact John Allsop, Borough Treasurer's Department, 22-24 Chancery Road, Ilford, 161 180. Telephone (01) 471 3020, extension 505 for an application form or ring David Hicks, Senior Analyst on extension 124 for further information.

Redbridge
London Borough

"Opportunities at Brintons"**COMPUTER PROGRAMMER**

Brintons Limited, a leading manufacturer of security systems, is looking for a Computer Programmer to join its established team currently working on an ICL 2904 machine.

The Company wishes to appoint an experienced Computer Programmer to join its established team currently working on an ICL 2904 machine.

Applicants, male or female, should possess a minimum of 3 years programming experience and must be thoroughly conversant with the use of Cobol. Some experience of Plan would be desirable. It will be an advantage if the applicant has experience on ICL 2904 machine.

A competitive salary will be paid, commensurate with the nature of the post together with other usual fringe benefits. These include an excellent pension and life insurance scheme, and the great work/life balance.

Please apply in writing, stating age, qualifications, experience and present salary to:

The Personnel and Training Manager, Brintons Limited, P.O. Box 18, Exchange Street, Aldershot, Hants GU11 1BB.

Brintons Limited

Isn't it time you KO'd that computer recruitment problem?

From October 5th 1978

COMPUTER WEEKLY

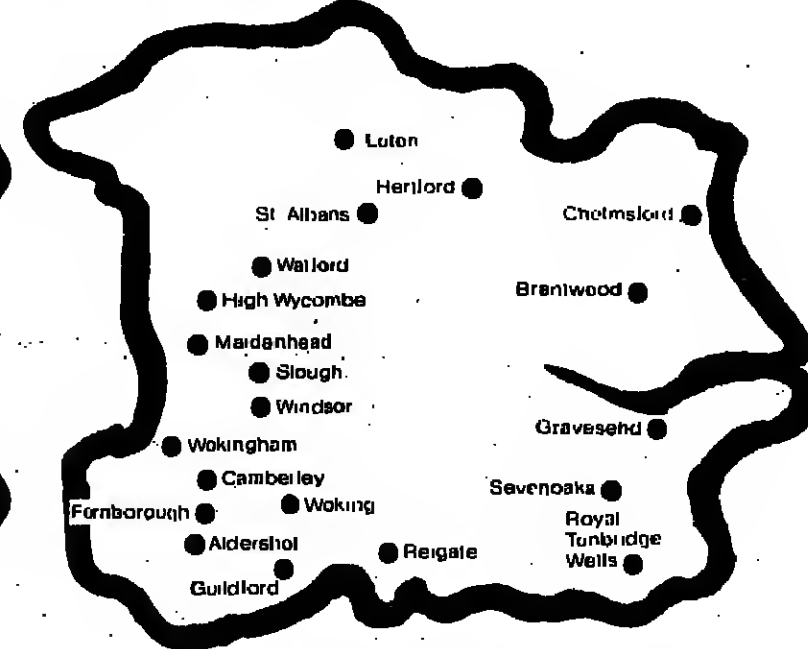
announces THE NEW ONE-TWO

1 ON THE AIR

48,000* D.P. professionals in the Greater London radio area are told to watch out for your advertisement in that week's Computer Weekly!

2 IN PRINT

Your potential employee will have received Computer Weekly at home or at the office and can immediately turn up your ad!

**How the scheme works**

It's a unique opportunity to tie in your Computer Weekly recruitment ad, with a spot on popular Capital Radio - at very low cost. The radio ad will give tempting outline details of your company and the job you are offering - and will then refer the listener to the appropriate page of Computer Weekly.

When it happens

It will be broadcast during the morning breakfast-and-drive-to-work period on the Friday of the week in which your advertisement appears. Younger prospects, who are probably late-evening listeners, will already have heard it late on the Thursday night.

Each advertiser gets approximately 8 seconds of a full minute-long Computer Weekly commercial. So you share in the cumulative impact of sixty seconds of computer-oriented broadcasting time, at a fraction of the cost of a full "job-spot" commercial.

Free production

What's more, Computer Weekly will produce your commercial spot free of charge, with highly professional studio and production facilities.

Cost and Conditions

The rate is £120 for a commercial spot of approx. 8 seconds on Capital Radio on both the Thursday and the Friday of the week your advertisement appears. The copy date remains at 12.00 Tuesday for a broadcast on the following Thursday and Friday. Extraction of the key points from your advertisement will be done by our expert staff - unless you yourself have indicated the points for inclusion. Unfortunately the salary offered cannot be announced over the air, due to the dangers of an escalation in OP staff salaries. Demo tapes are available for seriously interested advertisers.

RING CHRIS PRIOR ON 01-261 8028/8658/8000

But hurry! Bookings are strictly rationed until Dec. 1978!

Computer Weekly. The industry journal for the data processing professional.

*Computer Weekly circulation in Greater London area Sept. 1978

Computer Analyst

New Malden

The client, who is a big name in the Construction Business, require PROGRAMMERS AND ANALYSTS/PROGRAMMERS for their D.P. Department in New Malden, Surrey.

The installation of an NCR 75 user with Neat/3 and Cobol Development is in progress on an interactive on-line communications system written in Cobol with Neat/3 being phased out.

Programmers are required with 18 months' experience of Cobol on any machine or Neat/3 people who would like the opportunity of training. Analysts are required to have at least 1-2 years' involvement in Analysis work.

Salaries for programmers are negotiable around £5000 and £6000 for Analysts with the usual big company benefits. Ref CW/37/1

Computer Analyst

Up to £7,400

An international Systems House, who have offices throughout England and Western Europe, need ENGINEERS for their Micro Division.

The roles are varied but could include:

- * Evaluating
- * Commissioning
- * Interfacing the latest American Boards
- * Assessing client needs
- * Producing sales aids
- * Training Micro users

Their benefits include 4 weeks' holidays, staff mortgage service, group health insurance and regular salary and promotional reviews. Removal assistance is available where appropriate. Ref CW/37/2

Micro Division

A major international Systems House who are better known for their mainframe work, have a fast expanding Small Business Systems Division.

They have an urgent need to recruit people who range from Programmers with 2-3 years' experience, through to Senior Project Leaders.

All you need is exposure to ASSEMBLER on any machine, but if you have experience of SYSTEMS DESIGN, REAL-TIME ORDER ENTRY, or ORDER PROCESSING so much the better. Projects are all based on Real-Time APPLICATIONS on the ICL SYSTEM 10 and SINGER 1500 hardware.

Project teams usually consist of 3-4 people, allowing you to follow the project from specification through to implementation.

Salaries are well above market rate and the company can offer excellent career opportunities. Annual Bonus, plus usual Company Benefits one would expect from a company of this size. Ref CW/37/3

Systematic Programmers

Woking

Our client, an international manufacturer, has a need for Systems Programmers with IBM, ICL or DEC hardware experience. You should be conversant with more than one major hardware and software system. You should also be capable of understanding the characteristics of complex software. Your work will include:

- * Evaluating software packages
- * Testing out software facilities and performance
- * Writing middleware and basic software products
- * Advising and supporting application programmers

Therefore, we would like to hear from Systems Programmers with at least 2 years' experience who would like the opportunity of being involved on more than one operating system and more than one piece of hardware. Attractive salaries will be paid to the successful candidates. Ref CW/37/5

Production Control Software Developers 'Minis'

Germany

to £16,500

A unique opportunity has arisen based in Germany, for experienced professionals to join a project team being formed to improve an existing operating system and develop a Production Control Package.

The ideal experience may come from a variety of backgrounds in software development or production control, but will probably include some of the following:

Operating Systems, Interpreters, T.P. Monitors, File Handling, Database Techniques, Utilities and obviously Real Time Production Control on Minis.

Candidates with Production Control experience must be able to understand the requirements needed and specify the necessary solutions.

Ability to speak German would be useful but will not be a stumbling block. Relocation expenses will be paid to the successful candidates. Ref CW/37/4

RT11/Macro Assemblers

Middlesex & European Travel

£6,000

Our client, based in Middlesex, is involved in a specialist area of the OEM market. We wish to recruit an individual with a competent programmer to join their small but specialised European sales support group.

Working in a highly sophisticated environment, the successful candidate will be required to take responsibility for supporting salesmen in creating new software for user needs on DEC POP11/04s in addition to adapting and developing software to drive their equipment of various manufacturers.

This is an excellent opportunity for someone with the necessary skills to expand themselves in an unusual but stimulating job. A lot of short term European travel will be involved. Also, in addition to salary benefits, etc., a car package will be negotiated for exceptional candidates. Ref CW/37/6

Industrial Control Systems

Programmers/Designers Manchester

ONE OF THE UK'S LEADING SYSTEMS AND SOFTWARE HOUSES needs more staff for its Industrial division centred at Manchester.

Ideally, you should have experience of industrial applications in a manufacturing or process plant environment. A technical or technical application background will also be of interest. Almost all work will be of a real-time nature on mini or micro computing equipment.

Salaries will range from £4.5k to £7k depending on experience.

This is an excellent opportunity for people who wish to join a small but expanding group of professionals working on the building of advanced and often complex computer control systems for both UK and overseas users. Ref CW/37/7

Programmers & Analysts

£4.5K - £8K

Consider the benefits of:

- * Working in West London
- * Working on communications systems
- * Progression to project leadership
- * Variety of job content
- * Programme development through VDU's

If you are a Programmer or an Analyst and have had exposure to commercial applications (on any hardware), our client would be very interested to learn more about you and discuss your future. They are a well-established software house and offer a career path based on real time earning above average salaries and large company benefits.

Projects are divided into small teams and there are many opportunities for men and women with management potential to gain experience in project leadership at a very early stage. Ref CW/37/8

Neat/3 Programmer

West London

£5,000 +

A small but expanding DP department within a group of private companies requires a PROGRAMMER with at least 18 months' experience of NEAT/3 to help them in their planned expansion program.

The installation, an NCR 75 running under 81 Batch, is soon to be upgraded with the introduction of Real-time applications. This necessitates the change to COBOL as a programming language.

Therefore we would like to hear from Programmers who would like the opportunity of being retained in Cobol but staying with NCR hardware.

Situated in West London in new modern offices this company can offer excellent career prospects with the usual company benefits. Ref CW/37/9

Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212 Telex 27950
DUBLIN: Canberia House, 24 Lower Leeson Street, Dublin 2. Telephone 789577 (5 Lines)
Linked jointly by the Dept of Enterprise No. 58 (B) 170

Quota Income Package to £11000
(Basic c £7,000 plus 2 Litre car)

This is your chance to join one of the trendsetters of the mini computer market. Their products are in the forefront of computer technology and are taking the commercial, industrial and OEM markets by storm. They are an international organisation and are backed by the security and research capability of a 2 billion dollar corporation. Their market penetration is growing rapidly providing career prospects for ambitious self-motivated individuals that you would find hard to beat.

Our Clients, require Sales Engineers to sell computer systems to the OEM and sophisticated end user market in the 5K to 250K range. You will be managing existing accounts and developing new business in this rapidly changing market place. Ideally you will be a professional sales person with above average technical confidence and a proven track record in mini computer sales.

CONTACT: Advising Consultant, David Wade on 061-833 0427 or 0785 56013 after office hours REF CW9/80

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LIMITED

SCR

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35-37 Great Charles Street, Birmingham B3 2BR

MANCHESTER 061-833 0427

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LONDON 01-935 0671

Freepost 6, 12, Blanford Street,

London W1E 1JZ

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A division of ATA Selection and Management Services,
recruitment consultants to industry and Commerce since 1962.

READY FOR TEAM
LEADERSHIP?

circa £6,000
N.W. LONDON

Our clients are a major UK Finance and Leasing group and seek a senior Programmer who is able to make a positive contribution to the development of the new computer system.

It is envisaged that the successful applicant will assume the position of PROGRAMMING TEAM LEADER within 12 months.

The opportunities for further progression are excellent as substantial expansion is planned for the department.

Whilst the ideal candidate should have 2 years' programming experience in BASIC and on PDP 11's under RSTS, applications are invited from programmers capable of building a programming team preferably with a mini computer background.

For further details ring Steve Morton on: 01-637 0781 or alternatively write enclosing C.V. to: ATA Computer Recruitment, 230 Great Portland Street, London W1N 5HG.

LONDON (01) 637 0781 MANCHESTER (061) 832 5956 BIRMINGHAM (021) 643 1994
BRISTOL (0272) 211035 EDINBURGH (031) 226 5381 CRAWLEY (0293) 514071

TOP JOBS! TOP JOBS!

Junior Programmers
£3,000 to £4,300

S.E. ENGLAND
You have only 1 year's commercial experience? Then you are in great demand! We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them. CW 38/1 Tricia

Project Leader—Bank
£8,000 +

S.E. LONDON
A small but famous International Bank requires mature applicant to take charge of a small team dealing with banking systems re Payment Transfer and Foreign Exchange, so DEC PDP11 and supervisory experience is a must. Parks are excellent, including free meals and low rate mortgage payments. CW 38/2 Michael

Senior Consultants
£8,500-£12,000

CENTRAL LONDON
Six large, well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or ICL latest releases are essential. Excellent fringe benefits and prospects. CW 38/3 Michael

Mini Sales Engineer
£8,000 + Car + Commission

MIDLANDS AND LONDON BASED
Two major mini manufacturers require experienced salesmen with real-time or process control sales experience. These firms are going places so join now. Quota earnings up to £5K in first year plus excellent perks. CW 38/7 Michael

Freelance Programmers
To £260 p.w.

ICL COBOL/SHL City 3 months
ICL SPS/4 Unimode Liverpool 3 months
ICL Systems Analyst S.W. London 3 months
ICL 2800 Cobol Luton 3 months
ICL 2804 An/Prog Bank in Nigeria 6 months

Operators/Sen. Operators
To £4,200 inc.

N. MILTON KEYNES
Very good career prospects for ICL GII or GII operators with 1½ years' experience. Excellent relocation package plus non-C.P.S. and 4 weeks' holidays. CW 38/4 Tricia

Operator/Sen. Operator
—2 shifts
To £5,000 inc.

W.1
A multinational organisation with a with-IBM D08/V5 installation requires top-grade people. Only a two-shift system plus excellent perks which include non-C.P.S., free lunches and 4 weeks' holidays.

Operators/Sen. Ops.
£4,100 to £5,500 inc.

ENFIELD
Work for an institution here to stay! All you need is 1 year + IBM OS experience. Parks include removal expenses, C.P.S. and paid overtime. CW 38/5 Patricia

WEA

DATA EXPRESS HOUSE
PROSPECT PLACE
HEATHFIELD TERRACE
CHISWICK, W.A. 9BR

Recruitment Consultants

01-895 3883 or
01-556 6138 evenings

Apply NOW for the latest vacancies. IBM, HONEYWELL, DEC & ICL programmers wanted. Can a 4 week holiday and bonus plus an amazing BONUS. Ask for the Contract Officer on 01-895 3883/4148, 11pm.

SENIOR MANAGEMENT AND ANALYST OPPORTUNITIES

SYSTEMS ANALYST NORTH LONDON £6000 + Profit Share

Major British company who retain ICL 1900 series hardware is expanding rapidly and thus seeks 4 systems analysts with a minimum of 2 years' systems experience. Position includes a variety of new projects. Ideal applicant will have good commercial systems experience preferably in ICL environment. This is a senior position and is an ideal opportunity for someone to progress further into management.

Challenging position with opportunities in variety of areas.
Benefits include flexitime, 5 weeks' holiday, free lunch, sports and social club and discount on company products.
Excellent prospects

Ref. 1783

TEAM LEADER W. LONDON/BERKS £6000 + Overseas Travel

International group of companies with its outstanding reputation for efficiency, growth and investment seeks a Team Leader for one of its autonomous companies. Ideal applicant will have experience on HDN/WEW hardware and 3 years' programming experience in FORTRAN. Successful candidates will be working initially on a new project planned. This existing and challenging position involves overseas travel for short periods.

Excellent company benefits which include non-contributory pension, life assurance and sickness schemes.
RELOCATION assistance if required.

Ref. 1715

PROGRAMMER - MID-LEVEL E.L. 1000

International company manufacturing sophisticated technical products for world wide distribution seeks programmer for its newly created position. Company have recently installed PDP 11 using BASIC 4 and consequently require person with good knowledge of the same, with a good personality and strong desire to accept a challenge.

Prestige company with American backing.
Good deal of development work using integrated database.
Excellent prospects and only salary review.

Ref. 1742

PROJECT LEADER - CITY £6000 + Sub Mortgage

International Financial Institution has a vacancy for a Project Leader to lead a team of systems analysts in the development of a new system with a minimum of 18 months' experience in leading a team of systems analysts to successful achievement of a significant project preferably in a lower environment. Must have ability to communicate well with all levels of people and be able to make final decisions. They will IBM hardware and run under DOS/V.

Continued development in a well-planned system in a variety of areas.
Progressive organisation.
Good company benefits which include pension and social club.

Ref. 1782

SYSTEMS ANALYST - LONDON £7500 + Sub Mortgage

Highly reputed firm of Merchant Bankers with worldwide business interests are seeking systems analyst with either financial or insurance experience to work as a key figure within their D.P. services division. Ideal applicant should have worked in an IBM installation but other hardware will be considered.

Excellent working environment.
Job security.
Full banking benefits including personal bonus.

Ref. 1750

SYSTEMS ANALYST M. LONDON/HEITS to £7000

Leading insurance company based in North London/Harfordshire border area is seeking a systems analyst who has programming background preferably in ASSEMBLER and PL/I. The company retains IBM hardware and run under OS. Position involves working in areas of systems performance analysis and systems development. Ideal applicant will have insurance experience, however the company will consider other experience.

Excellent working conditions which include non-contributory pension scheme and subsidised staff restaurant.
Sub Mortgage after qualifying period of service.
Job security.

Ref. 1778

ANALYST PROGRAMMER CITY £6500 + Sub Mortgage

Established Merchant Bankers has opportunity for person with COBOL and PL/I or ASSEMBLER to work as Analyst Programmer. Ideal applicant will be in mid-20s with a degree and preferably will have worked in a financial environment. CICS would be an advantage but training will be offered. This is a super opportunity to follow a good career path.

Excellent scope to move into systems.
Banking benefits which include low interest loan and excellent sports/social club.

Ref. 1716

SENIOR SYSTEMS ANALYST EAST LONDON £7000 + Bonus

Our client, situated about 15 minutes from Liverpool Street and easily accessible from Eastern Home Counties, is seeking a senior systems analyst. Ideal applicant will have a programming background in COBOL. Preferably in ICL hardware. Company seeks people with good commercial systems experience, e.g. ledgers, stock control, payroll, etc.

Excellent working conditions which include flexitime.
Good promotional prospects.
Comprehensive range of projects.

Ref. 1781

SYSTEMS ANALYST - LONDON £7500

Exciting and challenging opportunity awaits a Systems Analyst within this worldwide and prestigious company. Ideal applicant will have programming background in COBOL and ASSEMBLER and at least 2 years' systems experience. Our client is awaiting the installation of IBM 370 in October and this is a super opportunity to work in a brand new area on new projects.

Super working environment.
Excellent career opportunities.
Recruitment of own team.
All new development work.

Ref. 1618

D.P.M. - MIDDLESEX £7000 + Car

Our client, a major British Company with their Head Office in Middlesex, has a vacancy for DPM to be responsible for all aspects of the dept., including prog. and analysis. Ideal applicant will have strong personality, confidence, management capabilities and be able to liaise at all levels. Company retains DEC POP hardware and seeks person with good programming background. This company offers a fantastic opportunity for young person to progress into management.

Excellent working conditions.
Security in growing organisation.
Fantastic fringe benefits.

Ref. 1706

SENIOR SYSTEMS ANALYSTS CITY

Multinational conglomerate company are seeking senior systems analysts with a minimum 5 years' D.P. experience including commercial analysis in an IBM environment. To undertake responsibility for major project phases. Ideal applicant will have CICS/VS and IMS experience but full training will be given.

Continued development with well-planned schedule.
Super working conditions including free lunch.
Varied projects proving an absorbing and interesting career.

Ref. 1791

SUPPORT ANALYST W. LONDON £6500 + Co Car

One of the fastest growing subsidiaries of an international mini computer manufacturer is moving shortly to brand new offices located W. London, adjacent to tube route. They are seeking an analyst to maintain a high level of back-up technical support within their group. Applicants should be familiar with small medium main computers with additional knowledge of IBM I/VS or System 3 useful but not essential.

Company expect to expand by 50% in coming year.
Excellent training in BASIC and all hardware/software in their product range.
RELOCATION expenses.

Ref. 1709

CONTRACT DIVISION

For further details ring our London Office 01-734 0152/3010 (24 hours)

UNITED KINGDOM

IBM CICS Ass. + PL/I
IBM IMS COBOL
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Honeywell 6000 COBOL
Burroughs 6700 COBOL
POP FORTRAN ASX IBM
POP MACRO II + COBOL
POP MACRO II ASX/IBM
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Phone now for immediate and future contracts
Ring Christina Kay/David Hayton, Tel. 734 0152 (24 hours)



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SPECIALISTS IN DP AND EXECUTIVE RECRUITMENT

ARE YOU THE SALESMAN OF THE YEAR?

REAL TIME MINI COMPUTER SYSTEMS

YOU CAN IMPROVE UPON YOUR EARNINGS WITH OUR CLIENT'S GENEROUS PACKAGE

£ £ £ £ £ £ £ NO LIMITS!

Our clients, a leader in mini computer manufacturing with a world-wide reputation, are looking for the BEST. If you are this person, we want to talk to you immediately. Why not phone this very moment or write and compare your career with the opportunity we are offering.

Our telephone number is Hurstpierpoint (0273) 833848 and we have a 24-hour answering service

International banking

Overseas Programming Assignments Small Computers

Up to £5,000 plus bonus

Morgan Guaranty, a leading international corporate bank, is expanding its network of international branches.

Responsibility for the development of systems and operating procedures for these new offices rests with a group based in London which provides a support function to new branches.

An outstanding opportunity exists for a programmer/analyst to join the project team to work on assignments supporting the modification and implementation of in-house applications written for NCR 299, 499 and Burroughs L9000 equipment.

The position involves a significant amount of international travel and applicants must be prepared to work for periods of 3 to 6 months outside the U.K.

Essential requirements are relevant technical experience, an ability to work under pressure and to strict deadlines, and a goal-orientated approach.

Salary is up to £5,000 plus excellent fringe benefits, which include generous overseas allowances, an annual bonus, low interest mortgage facilities, non-contributory pension, life insurance and private medical insurance plans.

Please write for an application form, or submit a full curriculum vitae, to Bill Swainson, Morgan Guaranty Trust Company of New York, P.O. Box 161, 33 Lombard Street, London EC3P 3BH.

Morgan Guaranty
Trust Company of New York

★ WILTSHIRE ★ SYSTEMS ANALYSTS

★ Starting salary £6,000 p.a. ★

SCR have been retained to recruit two Systems Analysts on behalf of an autonomous member of a large Commercial Organisation.

The company has achieved an enviable record of success since commencing operation and currently is expanding into the European market.

The commitment to usage of computing facilities is substantial to the extent that they have the use of a dual 2970 configuration which will adequately cater for future development needs.

★ The qualities sought by our client are: ★

- ★ commercial systems experience ★
- ★ the ability to communicate effectively with users to senior management level ★
- ★ dynamic approach to problem solving ★

It is emphasized that the company is a young and progressive concern and therefore considerable opportunities exist for advancement to more senior positions.

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Interested candidates should contact, without delay:

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Contact: Andy Wright

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A manufacturer of mini/micro computer-based systems is expanding its trouble-shooting hardware and software support teams. The work involves understanding customer problems and resolving them quickly and effectively as well as researching new in-house diagnostic procedures. Candidates should have a sound and detailed technical background, ideally on minis, with experience in Assembler and communications systems. Competitive salaries will be offered. Significant scope for further career development in an environment where ability, initiative and willingness to take responsibility is recognised.

Contact: Margaret Stevens

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A large international commodity trading organisation with interests in banking and shipping has an opportunity for an experienced d.p. specialist to set up and run a new installation in London.

The company is looking for a person with all round ability to develop and operate commercial systems on a HP3000. Candidates must have several years experience in a systems and programming environment and be self-motivated to cover all aspects of work in the London Data Centre. This appointment obviously has the potential to offer the senior position as the installation expands.

Salary is negotiable but will not be a limiting factor for the right person.

Contact: Jim Bokar

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

Systems Analysts

London up to £7,000
We have been retained by a large organisation to recruit a number of Analysts to join existing project teams developing advanced real-time applications. Applicants must have at least three years experience in a d.p. environment with the last year spent in the analysis/design of transaction based systems. Knowledge of database and real-time would be a distinct advantage. Exceptional opportunity to be involved in the design of sophisticated and unique systems. Salaries according to experience. Non-contributory pension scheme. Contact: Jim Baker

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All areas up to £6,000 + car
Several of our clients, mainly mini/micro computer suppliers or manufacturers, seek experienced Field and/or Support Engineers. Generally, the work involves dealing with a variety of problems associated with hardware and diagnostic software.

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There are excellent opportunities for design engineers to identify, develop and implement mini/micro computer based systems. Experience in either digital electronics, Assembler data communications, analogue interfacing or real-time systems is essential. The facilities available within the department include LSI 11, Intel and RCA micro-computers and DEC systems. All positions offer excellent remuneration packages, career prospects and work involvement. Contact: Margaret Stevens

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For further details ring ANNE CAMPBELL at (0734) 781178 or send a resume to her at MODULAR COMPUTER SERVICES, Broad Street, Wokingham, Berkshire.

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POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
COMPUTER MANAGER	to £9,700	GOVERNMENT	N. MIDDX.	IBM	Required to control, co-ordinate and develop computing work, proven managerial success essential in heading large team. Technical competence in both hard and software and financial ability.	38/1
SALES CONSULTANTS	Neg.	ELECTRONICS	U.K./EUROPE		Applications are invited from people with proven sales success, who have a working knowledge of IBM telecommunications concepts.	38/2
SENIOR ANALYSTS	To £6,500 + Car	SERVICE INDUSTRY	S. MIDDX.	ICL 1800	With five years' systems experience to act as project leader on a wide range of applications including all project work undertaken in a group of 10 or more and responsible for maintenance of project timetable and budget. Also expected to participate in the analysis of a wide range of business problems and solutions.	38/3
SYSTEMS PROGRAMMER	£7,500	CONSULTANCY	SURREY & MANCHESTER	MINIS	Applications are invited from candidates who will apply their experience of mini computer assembler programming and knowledge of operating systems or compilers for systems maintenance and development.	38/4
ANALYST/PROGRAMMERS	to £18,000	SYSTEMS HOUSE	W. GERMANY	MINIS	Qualified analyst/programmers with experience of writing real-time software on a variety of interfacing and demanding projects. Preferably working knowledge of German.	38/5
CHIEF PROGRAMMER	c. £6,500	MEDICAL TRADE	N. SURREY	1800/2900	Candidates should have of least five years' experience of programming ICL 1800/2900 tape and disc hardware. He/she must also have proven supervisory capabilities and will lead a programming team.	38/6
ANALYST PROGRAMMERS	£4,600-£8,000	TOY MANUFACTURERS	S. LONDON	POP-11	Applicants should have real experience in commercial, scientific or industrial applications with RSTS/E and have the capability to act as Team Leader, involving direct user contact systems design and programming responsibility.	38/7
PROGRAMMER	s. £4,000 + Benefits	CONSULTANCY	EC2	IBM	Probably educated to "A" level standard and used to working in a commercial environment with 12 months' COBOL programming experience in either an OS or DOS installation.	38/8
COMMERCIAL SOFTWARE SUPPORT ANALYSTS	s. £6,500 + Car	MANUFACTURER	E. BERKS.	MINIS	Due to rapid expansion top calibre people are required to develop the growing base of commercial installations. Applicants should be over 25 with four years' experience of COBOL and other commercial software, e.g. ISAM, TP or DBMS. Knowledge of assembly languages and OS software advantageous.	38/9
PROGRAMMERS	To £5,400 + Bonus + Mortgage +	INTERNATIONAL BANK	E. LONDON	IBM 370	Programmers with about two years' experience who after a period will be capable of taking Team Leader responsibility. The major language is PL/I but will consider those with experience in other languages for retraining. Experience of CICS an asset.	38/10
SERVICE CONSULTANTS	A1 Neg.	SYSTEMS AND SOFTWARE HOUSE	MUNICH		A senior consultant with a strong background in COBOL and at least two other languages required to help with the co-ordination of high level language solutions. A knowledge of German would be a distinct advantage.	38/11
PROGRAMMERS/CONSULTANTS	To £8,000 +	TECHNICAL CONSULTANCY	SURREY	MINIS MICROS	This rapidly expanding consultancy requires staff at all levels to work on advanced software/technical applications in the area of communications, real-time process control, and basic software.	38/12
ANALYSTS & PROGRAMMERS	To £8,500 +	SOFTWARE HOUSE	W.I.	ANY	Excellent career prospects for ambitious Analysts and Programmers with minimum of one year's commercial experience to join this well established organisation.	38/13
COBOL PROGRAMMERS & ANALYST PROGRAMMERS	To £10,000 & To £16,000 + Benefits	MANUFACTURING COMPANY	AMSTERDAM	370/126	Our clients have an IBM 370/126 operating under DOS/VSE and are looking for proven experience in on-line systems (using CICS), Financial Administration and Stock Control experience would be advantageous.	38/14
PROGRAMMER/ANALYSTS	s. £6,500 + Flexitime	PETROCHEM	EC2	UNIVAC 90/60	Three years' experience of COBOL programming, preference will be given to candidates with experience of programming on-line applications. Preferred age range 25-30.	38/15
COBOL PROGRAMMERS	c. £5,500 + Expenses	AIRFREIGHT FORWARDER	UK/EUROPE	MINIS	Based in South-Midddx., the work involves extensive travelling for experienced programmers to help install minis at European locations.	38/16
SYSTEMS ANALYSTS & PROGRAMMERS	To £8,000 + Benefits	FOOD RETAILERS	KENT	370/138	Enquiries are invited from candidates with experience of the following: on-line systems under CICS; Database IBM DB/1; modelling, forecasting and simulation; Point of sale data capture; high level languages COBOL or PL/I; B18, APL.	38/17



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This is a key role in the new manufacturing plant at Wokingham providing software support to the European manufacturing area. This will involve assisting systems level technicians in diagnostic and operating system check-out, and generating total software packages to customer specifications. Ideal candidates will have about five years experience of software design, support or troubleshooting.

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to £9,000 p.a.

We need two highly experienced software designers to establish the development and maintenance of all new communications products at Wokingham. Each will have the ability to take a product through to implementation either as an individual or team leader. Experience is desirable in communications, operating systems, assemblers, emulators etc., at a design or support level.

UK
Software
Support

to £7,500 p.a. + car

This is a Coventry-based job providing highly technical software support to clients throughout the UK. This requires a detailed background of operating systems and systems software, preferably in a real-time communications environment, and a desire to work in a troubleshooting capacity.

Company benefits are excellent and include free BUPA and non-contributory pension. Relocation is possible.

For further details ring ANNE CAMPBELL at (0734) 781178 or send a resume to her at MODULAR COMPUTER SERVICES, Broad Street, Wokingham, Berkshire.

MODCOMP

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NEW ZEALAND Christchurch ANALYSTS AND PROGRAMMERS

THE COMPANY is a New Zealand's major manufacturing organisation in the garment and textile industry. Their head office is situated in Christchurch. They have branches, sales offices and manufacturing units throughout New Zealand with additional offices in Australia and the United States.

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VACANCIES - they require experienced analysts and programmers to join their development team.

Qualifications - applicants must have a proven record of achievement in implementing major systems.

A professional approach in the use of change is essential.

Previous ICL 1900 experience desirable - 2901 experience would also be an advantage.

Ability and personality to work in a team environment.

REWARDS AND BENEFITS - excellent commencing salaries - commensurate with applicant's experience and ability.

Assistance with relocation expenses to New Zealand, and assistance with accommodation on arrival. Small superannuation scheme after qualifying period.

Our client will be visiting the United Kingdom for the purpose of interviewing prospective applicants during the last two weeks of September, 1978. In the last instance, please contact our associates.

Chad Stolper, Prosport Computers Limited, 6 Bloombury Square, London, WC1. Telephone: 01-242 2142.

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A Systems Analyst is required to work on a complete review of all systems in the operating companies. A minimum of two years systems experience is required but the ability to work on own initiative and liaise at all levels within the division are of paramount importance. There will be deep involvement in projects from feasibility through to implementation.

If you have the necessary qualifications and would like to be considered for this position, please call in or phone for an Application Form. Ames Personnel, Suite 14, Dryden Chambers, 119 Oxford Street, London W1R 1PA.

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01-434 1106

Technical Programmer

LONDON SE1

The Computing Branch provides general computing services and technical assistance to administrative departments, research staff, and power stations in South East England.

A Technical Programmer is required for work on mini-computers used in power stations and by research staff for monitoring plant and collecting data. At least one year's practical experience in programming for PDP11 or similar computer, preferably on real-time systems.

Salary within a scale ranging from £4,184 to £4,738 per annum according to qualifications and experience.

The minimum qualification for this post is 'A' level mathematics and a degree or professional qualification would be preferred. Appropriate subjects would be computing science, mathematics, physics, electronics, electrical/electronic engineering.

Applications quoting Vacancy Number 1390/78/JEE giving full details should be forwarded to the

Personnel Officer (Electronics),
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Berkshire House, Sumner Street,
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South Eastern Region

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The person appointed will work in the area of academic support and will be involved in the design and implementation of innovative computer systems.

Minimum requirements: a degree or equivalent in computer science or a related field, and a minimum of two years' experience in the design and implementation of computer systems.

Applicants should have a number of years' experience in computer system design and implementation and educational qualifications up to degree level.

Interested applicants should ring the Systems and Program Unit Manager on Milton Keynes 33424 for further details.

Application forms are available by postcard request please, enclosing a SAE, to: The Recruitment Office (J0377), The Open University, P.O. Box 77, Milton Keynes MK8 3BA. Tel: 0527 8344. or telephone Milton Keynes 33424. There is a 24-hour answering service on 0527 8344.

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Responsible to the Financial Systems Manager, the holder of the post will be involved with 8850 Ogle Entry Commercial Systems and computer links to ICL Computers (1900 and 2800 Series). It is essential that applicants have COBOL programming experience and ideally, experience in Systems Analysis experience relating to IOL machines.

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SENIOR SYSTEMS ANALYST

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Reporting to the Corporate Controller and located within easy access of the U.K., you will be responsible for the regular provision of an effective service to management including a major re-evaluation of the Company's management information needs and for the development of related systems. In addition the complete overhaul

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Please write to Richard Varcoe (quoting CV 121) showing how you meet the specification and enclosing details of your career to date.

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Write with full personal and career details to Position Number AGC 6988, Austin Knight Limited, London W1A 1DS.

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Application in confidence to: Tim Gregory

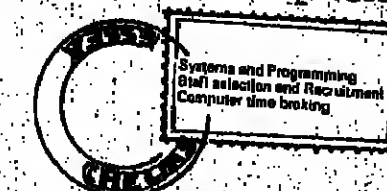
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Franklin Mini Limited is the U.K. Division of the world's largest private mini which makes and distributes silver, bronze, pewter, crystal and porcelain collectibles and objects d'art. We are now seeking to recruit a further two Computer Operators for our new Honeywell 6000, due in early 1978.

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Address		Telephone	
Post Code		Home	
Age		Date of Birth	
Place of Birth		Nationality	
Height		Weight	
Married		Children	
Car Owner		Driver	
Position Required		Required Salary Range	
Present Position		Salary	
WHERE DO YOU WISH TO WORK			
Within U.K.		Yes/No	
Will you move		Yes/No	
Acceptable Areas		Abroad	
Europe		Yes/No	
Middle East		Yes/No	
NUMBER OF YEARS EXPERIENCE			
Operating		Programming	
Systems Design		Systems Analysis	
Management		Total	
Available for Interviews			
Available for Employment			
DETAILS OF SECONDARY AND FURTHER EDUCATION			
Schools		Date	
Examinations Passed			
College/University		Date	
Examinations Passed			
Business Courses with Dates			
1. Present Employer			
Position		Town	
Date Joined			
TYPE OF INSTALLATION			
Commercial		Bureau	
Manufacturing		Banking	
Insurance		Education	
Scientific		Engineering	
HARDWARE			
OPERATING SYSTEM			
LANGUAGES			
Software or Packages			
On-Line			
R.J.E.		Real Time	
Tele Processing		Data Base	
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)			
Cost Accounting		General Ledger	
Budgeting		Credit Control	
Forecasting		Order Processing	
Corporate Planning		Marketing	
Sales Ledger		Distribution	
Purchase Ledger		Traffic Analysis	
Manpower Planning		Stock Control	
Production Control		Petrochemicals	
Linear Programming		Simulation	
Personnel		Payroll	
O.R.		Radar	
Statistics			
Projects Completed			
Responsibilities			
2. Previous Employer			
Position		Town	
Date Joined			
TYPE OF INSTALLATION			
Commercial		Bureau	
Manufacturing		Banking	
Insurance		Education	
Scientific		Engineering	
HARDWARE			
OPERATING SYSTEM			
LANGUAGES			
Software or Packages			
On-Line			
R.J.E.		Real Time	
Tele Processing		Data Base	
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN			
Cost Accounting		General Ledger	
Budgeting		Credit Control	
Forecasting		Order Processing	
Corporate Planning		Marketing	
Sales Ledger		Distribution	
Purchase Ledger		Traffic Analysis	
Manpower Planning		Stock Control	
Production Control		Petrochemicals	
Linear Programming		Simulation	
Personnel		Payroll	
O.R.		Radar	
Statistics			
Projects Completed			
Responsibilities			
PLEASE CHECK THAT EACH SECTION HAS BEEN TICKED APPROPRIATELY			
ADDITIONAL INFORMATION			
General			
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Date _____ Signature _____



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DATE _____

CH 8/78

THE SALES BIT

Prospecting and
evaluating

ONE of the prime activities of the company I work for is recruitment, which in turn is devoted to sales and marketing personnel. As a result we have a special application form which asks candidates to make a wide range of statements about their selling experience, including their most extreme likes and dislikes. By far the most common dislike is "cold-calling", prospecting, pioneering, cold canvassing, call it what you will. To most it is demotivating; to many it is a necessary chore. Very few find it a stimulating and rewarding process - but it can be. It is merely a matter of doing it right, based on good strategy and common sense.

The most important aspects are "vertical mar-
keting" and good sources of reliable company information. Vertical marketing is simply the process of con-
fining activity to a particu-
lar application within a
specific industry. Prospecting is so much easier and effective when carried out in this fashion. The sales-
man soon develops an appreciation of the prob-
lems and opportunities with his chosen market sec-
tor which in turn gives him greater confidence and thus he is more likely to achieve success.There are many sources of information to call upon, and these can be divided into two categories:
1. Identification of possible business opportunities.
2. Company information for the purpose of construct-
ing a selling strategy.
One of the best sources of new business is existing clients. I don't mean, "Please Mr Customer will you have some more", that is for account managers and sales support analysts. It is the process of discovering from a satisfied existing client who else in this particular industry or locality might have a requirement for similar data processing methods. You will be surprised how well informed your client is, often to the point of naming the best to contact.

Press articles, both the national Press and trade journals, are also a good source of information, and for salesmen selling peripherals, software, consumables, etc, recruitment advertising is a good source of specific prospects.

There are four directories which are of considerable value to salesmen within the computer industry:
1. Computer Users' Year Book.
2. Dun and Bradstreet.
3. Kompass.
4. Stock Exchange Year Book.

Another good source of information is the telephone operator of an identified prospect, particularly regarding the names of specific individuals. Secretaries, can also provide valuable data, providing you treat them right.

Thus, and with real marketing knowledge in the form of defined prospects and company information, the salesman is ready to pick up the telephone and make his first call to the prospect. The objective is to make an appointment.

Trade associations are

TRADER

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DIAGNOSTICS in field service work in the application for a portable ruggedised photoelectric paper tape reader now available from Data Precision (Equipment) Ltd.

It can read any known 5, 6 or 8 track punched paper tape at speeds up to 250 characters per second. Reading is bi-directional and the high red light emitting diodes and photo-transistors are unaffected by ambient light, according to Data Precision.

The reader, which is based on Data Precision's DP203 tape reader, can handle reels or loose wound tape.

Puzzle answer

THE sequence consists of the first four digits placed back to back, so the next one is:

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extension 2047). John Olford, Manager Dataskil
(Australia) will be interviewing in London during
mid-July.Dataskil (Australia)
The Computer Professionals

